APPENDIX II

ENABLERS

Appendix II contains the Next Generation Air Transportation System (NextGen) Enablers in numerical order according to their unique identification number. Enablers represent material or non-material solutions that support an improved level of performance in an Operational Improvement or another Enabler.

Each listing displays a timetable and the following information for each Enabler:

Enabler Description: The Enabler description defines the material or non-material solution that will contribute and support an operational improvement or another Enabler.

Suggested Office of Primary Responsibility (SOPR): The suggested Partner that will have primary responsibility for this Enabler.

Suggested Office of Collateral Responsibility (SOCR): The suggested Partner (s) that will collaborate with the SOPR to implement the Enabler.

Primary Supported OIs: If the Enabler is required to OIs, this field lists those OIs that are directly supported by the reference Enabler. Other OIs may also be supported by the reference Enabler through secondary relationships with the primary supported OIs.

Primary Supported Enablers: If the Enabler is required to support other Enablers, this field lists those Enablers that are directly supported by the reference Enabler. Other Enablers may also be supported by the reference Enabler through secondary relationships with the primary supported Enablers.

Enabler Group: The Functional Group where the Enabler is cataloged

Initial Availability (IA): The reference Enabler number, title and IA date are listed on the first line of the timetable. The IA date is listed as well as indicated with a blue square with an "E" label in the IA year within the timetable.

Primary Prerequisites: The timetable lists the primary prerequisite planning elements that are required to implement the reference Enabler. Further information on the listed planning elements including secondary prerequisites can be found in the Appendix or the Joint Planning Environment (JPE).

Prerequisite's Initial Availability Date: The timetable lists the initial availability dates for each prerequisite Enabler, R&D Activity and Policy Issue. Each of the elements listed are key for the realization of this reference Enabler and must be available before or on the IA date.

Complete information on IWP planning elements is available in the interactive Joint Planning Environment (JPE). The JPE is available at www.jpdo.gov.

Enabler Listing

EN-0002   Network-Enabled Flight Object Information

Description: The Flight Object is a software representation of the relevant information about a particular flight including, approved and alternate preferred flight plans, aircraft and flight crew capabilities, position and intent information, etc. It is available to all Air Navigation Service Providers (ANSP) and can be updated by the operator.

   SOPR: FAA   *Primary Supported OIs:* OI-0306, OI-0358, OI-4502

   SOCR: *Primary Supported Enablers:* EN-0003, EN-4521, EN-5022

Enabler Group: Aeronautical Information Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0002: Network-Enabled Flight Object Information							E 2014											
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E 2011														
PI-0024: Secure Information Exchange	P 2008																	
PI-0001: Airport Operation Centers (AOC) Equipage Implementation Policy						P 2013												

EN-0003   4D Flight Plan Management Decision Support - Level 2

Description: Air Navigation Service Provider (ANSP) decision support automation that allows the pre and inflight collaboration with Flight Operations Centers (FOC) and other flight schedulers to optimize flight plans via a collaborative Air Traffic Management (ATM) process. This process is based on a common understanding of current and projected airspace status and constraints, including demand, weather, and planned capacity management, flow contingency management, trajectory management strategies and initiatives.

   SOPR: FAA   *Primary Supported OIs:* OI-0306, OI-0406

   SOCR: *Primary Supported Enablers:*

Enabler Group: Flight Planning and Data Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0003: 4D Flight Plan Management Decision Support - Level 2											E 2018							
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-0207: Consolidated Aeronautical Information - Level 2 Integrated Status						E 2013												
EN-2010: NextGen 4D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-0002: Network-Enabled Flight Object Information							E 2014											
EN-0006: 4D Flight Plan Management Decision Support - Level 1							E 2014											

EN-0004   4D Flight Plan Automation - ANSP

Description: Enabler for Air Navigation Service Providers (ANSP) management of flights by Four Dimensional Trajectory (4DT). Does not require operator to file 4DT or 4DT negotiation between operator and ANSP.

   SOPR: FAA   *Primary Supported OIs:* OI-0303, OI-0306

   SOCR: *Primary Supported Enablers:* EN-0005, EN-0006

Enabler Group: Flight Planning and Data Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0004: 4D Flight Plan Automation - ANSP							E 2014											
EN-1231: NextGen Enterprise Network - FAA				E 2011														
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E 2011														
EN-1273: NextGen Weather Information Services - FAA Group 1				E 2011														

EN-0005   4D Flight Plan Automation - Operator

Description: Flight operators have means to file flight plans as requested Four Dimensional Trajectory (4DT) through Flight Operation Centers (FOCs) or private services.

   SOPR: FAA   *Primary Supported OIs:* OI-0303, OI-0306

   SOCR: *Primary Supported Enablers:* EN-0006
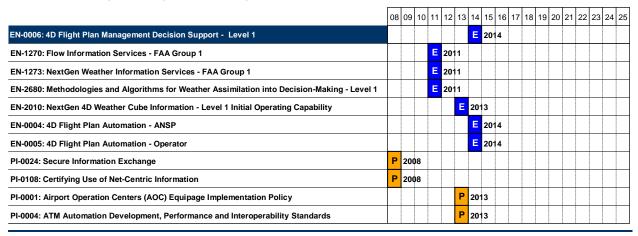
Enabler Group: Flight Planning and Data Management Enablers

Enabler Listing																			
	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0005: 4D Flight Plan Automation - Operator							E 2014											
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E 2011														
EN-0004: 4D Flight Plan Automation - ANSP							E 2014											
PI-0024: Secure Information Exchange	P 2008																	
PI-0108: Certifying Use of Net-Centric Information	P 2008																	
PI-0001: Airport Operation Centers (AOC) Equipage Implementation Policy						P 2013												

EN-0006 4D Flight Plan Management Decision Support - Level 1

Description: Flight operators through Flight Operation Centers (FOCs) or private services have means to analyze Four Dimensional (4D) flight trajectories with respect to Traffic Flow Management (TFM) initiatives, weather prediction through access to information and flow analysis tools common with Air Navigation Service Providers (ANSP).

    SOPR: FAA   *Primary Supported OIs:* OI-0303

    SOCR: *Primary Supported Enablers:* EN-0003

Enabler Group: Flight Planning and Data Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0006: 4D Flight Plan Management Decision Support - Level 1							E 2014											
EN-1270: Flow Information Services - FAA Group 1				E 2011														
EN-1273: NextGen Weather Information Services - FAA Group 1				E 2011														
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-2010: NextGen 4D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-0004: 4D Flight Plan Automation - ANSP							E 2014											
EN-0005: 4D Flight Plan Automation - Operator							E 2014											
PI-0024: Secure Information Exchange	P 2008																	
PI-0108: Certifying Use of Net-Centric Information	P 2008																	
PI-0001: Airport Operation Centers (AOC) Equipage Implementation Policy						P 2013												
PI-0004: ATM Automation Development, Performance and Interoperability Standards						P 2013												

EN-0007 High-Density Arrival/Departure Detail Operational Concept

Description: An operating concept will be defined for high-throughput, high-efficiency transition, arrival, and departure operations for high-density terminal areas. This concept will define an effective combination of time-based metering, management by Four Dimensional Trajectory (4DT), and sequence-based pair-wise spacing.

    SOPR: FAA   *Primary Supported OIs:* OI-0320, OI-0325, OI-0330, OI-0334, OI-0402, OI-0403

    SOCR: *Primary Supported Enablers:* EN-0009

Enabler Group: Integrated Operation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0007: High-Density Arrival/Departure Detail Operational Concept				E 2011														
D-0880: Terminal and Surface Low Visibility ConOps		D 2009																

Enabler Listing

EN-0008   Trajectory Negotiation - Level 1 Controlled Time of Arrival (CTA)

Description: The initial suite of integrated Air Navigation Service Provider (ANSP) automation tools that support the negotiation of trajectory information. This initial suite supports the negotiation of Controlled Time of Arrivals (CTAs) into high-density terminal areas. These tools integrate demand and capacity information into the trajectory negotiation process resulting in a CTA that consistently delivers aircraft to the runway to match airport acceptance rates. A "trajectory" at this level is an agreement between the flight operator/crew and the ANSP to meet the full trajectory time to the runway. CTAs may be communicated to the cockpit by voice or data. A CTA may be negotiated hours before departure or while the aircraft is airborne.

SOPR: FAA   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-0110

Enabler Group: Trajectory Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0008: Trajectory Negotiation - Level 1 Controlled Time of Arrival (CTA)						E 2013												
EN-1032: Radio-Based Voice Network - Legacy VHF/UHF	E 2008																	
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-1006: Integrated Cooperative Surveillance Information - Level 1						E 2012												
R-0960: Applied Research on 4D Trajectory Evaluation, Planning, Presentation and Negotiation					R 2011													
D-0830: Trajectory Negotiation Protocols for Air and Ground Information Architectures					D 2011													
D-1200: Guidance for Trajectory-Based Procedures					D 2011													
PI-0001: Airport Operation Centers (AOC) Equipage Implementation Policy						P 2013												

EN-0009   Integrated Trajectory/Separation Management - Terminal

Description: Air Navigation Service Providers (ANSP) automation integrates the management of arrival/departure and surface operations including the generation, negotiation and active management of full Four Dimensional Trajectories (4DTs). The automation also integrates trajectory management with separation management that incorporates wake turbulence separation requirements to provide safe and efficient control of flow and capacity in terminal airspace. Separation management is automated with supervision by human controllers.

SOPR: FAA   *Primary Supported OIs:* OI-0339, OI-0363

SOCR: *Primary Supported Enablers:*

Enabler Group: Integrated Operation Enablers

Enabler Listing

Enabler	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0009: Integrated Trajectory/Separation Management - Terminal															E 2022			
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-0007: High-Density Arrival/Departure Detail Operational Concept				E 2011														
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E 2011														
EN-1206: Air - Ground Data Exchange – Clearance and Instruction Services – Tower Group 1					E 2012													
EN-0110: Trajectory Negotiation - Level 2 En Route Time-Based Metering						E 2013												
EN-5004: Airport GSE Surface Management System						E 2013												
EN-0103: Avionics - Trajectory Management - Arrival/Departure								E 2015										
EN-0109: Avionics - Surface Conflict Management									E 2016									
EN-1207: Air - Ground Data Exchange – Clearance and Instruction Services – Tower Group 2										E 2017								
EN-1212: Air - Ground Data Exchange – Clearance and Instructions Services – TRACON Group 1										E 2017								
EN-1213: Air - Ground Data Exchange – Clearance and Instructions Services – TRACON Group 2										E 2017								
EN-1208: Air - Ground Data Exchange – Clearance and Instruction Services – Tower Group 3															E 2022			
EN-1214: Air - Ground Data Exchange – Clearance and Instructions Services – TRACON Group 3															E 2022			
R-0410: Applied Research on the Integration of Arrival/Departure and Surface Operations													R 2020					
D-2135: Air and Ground Separation Management Architecture													D 2020					
D-0920: Traffic Spacing Management Components in Terminal and Transition Airspace													D 2020					
PI-0005: Public Acceptance of Automation			P 2010															
PI-0004: ATM Automation Development, Performance and Interoperability Standards						P 2013												

EN-0016   Separation/Trajectory Management Detail Operational Concept

Description: The operational concept that defines the future roles of humans and automation to perform Separation and Trajectory Management (TM) functions in the NextGen environment. This concept will include roles for Air Navigation Service Providers (ANSP) as well as flight operator personnel. The concept will define the division of responsibilities that will guide the development of procedures and automation system requirements.

SOPR: FAA

Primary Supported OIs: OI-0348, OI-0355, OI-0356, OI-0358, OI-0359, OI-0360, OI-0361, OI-0362, OI-0363, OI-0368, OI-0369, OI-0370

SOCR:

Primary Supported Enablers: EN-0008, EN-0009, EN-0017, EN-0021, EN-0022, EN-0032, EN-0034, EN-0035, EN-0037, EN-0038, EN-0212, EN-0301, EN-1207, EN-1208, EN-1210, EN-1211, EN-1213, EN-1214

Enabler Group: Separation Management Enablers

Enabler	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
R-1620: Applied Research on Spacing Management in Congested En Route Airspace	R 2008																	
D-1200: Guidance for Trajectory-Based Procedures	D 2008																	
PI-0005: Public Acceptance of Automation			P 2010															
PI-0006: Balance of Human vs. Automation			P 2010															

Enabler Listing

EN-0017   Trajectory Negotiation - Level 3 Automation-Assisted 4DTs

Description: Enhancements to the integrated suite of Air Navigation Service Providers (ANSP) automation tools that support the overall management of trajectory negotiation. These enhancements provide management and negotiation of flexible trajectories through any airspace, without reference to named waypoints. These four-dimensional trajectories (4DTs) are negotiated between flight crews/operators (including UAS [Unmanned Aircraft System] operators) and the ANSP at a time varying from hours before departure to while the aircraft is airborne. This level of automation includes some trajectory optimization; for example, automatic consideration of other traffic and aircraft capabilities. However, this enabler does not include automation of such extent, quality, and immediacy to relieve controllers of any separation management responsibilities. Final acceptance of a trajectory requires the participation of human actors (pilots, controllers) on each end of the negotiation. Air-ground data exchange is necessary to efficiently convey 4DTs to and from cockpit systems.

> *SOPR:* FAA   *Primary Supported OIs:* OI-0358, OI-0360
> *SOCR:*   *Primary Supported Enablers:* EN-0018

Enabler Group: Trajectory Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0017: Trajectory Negotiation - Level 3 Automation-Assisted 4DTs											E 2018							
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-0034: Trajectory Management Decision Support - Level 1						E 2013												
EN-0110: Trajectory Negotiation - Level 2 En Route Time-Based Metering						E 2013												
EN-1506: Integrated Cooperative Surveillance Information - Level 2								E 2015										
EN-1207: Air - Ground Data Exchange – Clearance and Instruction Services – Tower Group 2										E 2017								
EN-1213: Air - Ground Data Exchange – Clearance and Instructions Services – TRACON Group 2										E 2017								
EN-1210: Air - Ground Data Exchange - Clearance and Instructions Services - En Route Group 2											E 2018							
R-0960: Applied Research on 4D Trajectory Evaluation, Planning, Presentation and Negotiation									R 2016									
D-0830: Trajectory Negotiation Protocols for Air and Ground Information Architectures									D 2016									
D-1200: Guidance for Trajectory-Based Procedures									D 2016									

EN-0018   Trajectory Negotiation - Level 4 Automated 4DTs

Description: Enhancements to the integrated suite of Air Navigation Service Providers (ANSP) automation tools that support the automated management of trajectories negotiation. These enhancements integrate auto-negotiation of ANSP and aircraft/operator four-dimensional trajectories (4DTs) with separation management. 4DTs are negotiated between flight crews/operators (including UAS operators) and the ANSP at a time varying from hours before departure to while the aircraft is airborne. ANSP systems perform separation management as trajectories are generated and negotiated. ANSP automation considers all real-time aircraft, airspace constraints, and aircraft capabilities for trajectory negotiation. The flight crew is responsible for final acceptance of negotiated trajectory for crewed aircraft. Explicit acceptance by a human controller is not necessarily required.

> *SOPR:* FAA   *Primary Supported OIs:* OI-0369, OI-0370
> *SOCR:*   *Primary Supported Enablers:* EN-0032

Enabler Group: Trajectory Management Enablers

Enabler Listing																		
	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0018: Trajectory Negotiation - Level 4 Automated 4DTs													E	2020				
EN-0017: Trajectory Negotiation - Level 3 Automation-Assisted 4DTs											E	2018						
EN-0037: Trajectory Management Decision Support - Level 2											E	2018						
EN-1507: Integrated Cooperative Surveillance Information - Level 3													E	2020				
R-0680: Applied Research on the Methodologies for Dynamically Allocating NAS Resources											R	2018						
R-0960: Applied Research on 4D Trajectory Evaluation, Planning, Presentation and Negotiation											R	2018						
D-0830: Trajectory Negotiation Protocols for Air and Ground Information Architectures											D	2018						
PI-0005: Public Acceptance of Automation			P	2010														
PI-0077: High Density Operations - Flight Prioritization							P	2014										
PI-0007: Rules of the Road											P	2018						

EN-0019 Virtual Tower - Detail Operational Concept

Description: A detail operational concept will be developed based on a policy decision (PD) regarding appropriate roles and responsibilities for humans vs. automation and for flight operators vs. Air Navigation Service Providers (ANSPs) in supporting safe and efficient low-visibility operations at airports of varying demand loads and configuration complexities. Automated Virtual Towers (AVTs) will provide enhanced air traffic advisory service at low-volume airports which are currently uncontrolled or non-towered. Staffed Virtual Towers (SVTs) will provide air traffic services at moderate to large terminals.

> *SOPR:* FAA *Primary Supported OIs:*
> *SOCR:* *Primary Supported Enablers:* EN-0020, EN-0021

Enabler Group: Virtual Tower Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0019: Virtual Tower - Detail Operational Concept				E	2011													
D-0240: Facility and Networking Alternatives		D	2009															
D-1360: Virtual Tower Capability		D	2009															
PI-0006: Balance of Human vs. Automation			P	2010														

EN-0020 Staffed Virtual Tower Capability

Description: Staffed Virtual Towers (SVT) provide a more cost-effective way to provide tower services to moderate and large terminals. Staffing can be more flexible and efficient, and the cost to build a tower is no longer a barrier to delivering services. The virtual tower may be physically located at the airport or at a remote location.

> *SOPR:* FAA *Primary Supported OIs:* OI-0409
> *SOCR:* *Primary Supported Enablers:*

Enabler Group: Virtual Tower Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0020: Staffed Virtual Tower Capability								E	2015									
EN-0019: Virtual Tower - Detail Operational Concept				E	2011													
EN-1231: NextGen Enterprise Network - FAA				E	2011													
PI-0004: ATM Automation Development, Performance and Interoperability Standards						P	2013											

EN-0021 Automated Virtual Tower - Level 1 Single Runway Airport

Description: Tower operations provided through Automated Virtual Tower (AVT). Enabler includes Concepts of Operations (ConOps), technologies, procedures, standards, etc., for AVT operations for single-runway airports. Two implementation alternatives: separation functions provided by ground automation, or sequencing provided by ground automation and separation functions provided by aircraft operators. In either scenario, wake turbulence separation requirements, and data required to determine them, must be incorporated into separation functions.

> *SOPR:* FAA *Primary Supported OIs:*
> *SOCR:* *Primary Supported Enablers:* EN-0022

Enabler Group: Virtual Tower Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0021: Automated Virtual Tower - Level 1 Single Runway Airport								E 2015										
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-0019: Virtual Tower - Detail Operational Concept				E 2011														
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E 2011														
PI-0005: Public Acceptance of Automation			P 2010															
PI-0006: Balance of Human vs. Automation			P 2010															
PI-0004: ATM Automation Development, Performance and Interoperability Standards						P 2013												

EN-0022   Automated Virtual Tower - Level 2 Multiple Runway Airport

Description: Tower operations for multiple-runway airports and for low-traffic operation periods at towered or staffed virtual tower (SVT) airports, including surface movement, provided through Automated Virtual Tower (AVT). Includes Concepts of Operations (ConOps), technologies, procedures, standards, etc. Two implementation alternatives: separation functions provided by ground automation, or sequencing provided by ground automation and separation functions provided by aircraft operators. For either alternative, wake turbulence separation requirements, and data required to determine them, must be incorporated into separation functions.

SOPR: FAA	*Primary Supported OIs:* OI-0410
SOCR:	*Primary Supported Enablers:*

Enabler Group: Virtual Tower Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0022: Automated Virtual Tower - Level 2 Multiple Runway Airport									E 2016									
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-0021: Automated Virtual Tower - Level 1 Single Runway Airport								E 2015										
EN-0026: Surface Movement Decision Support - Level 2 Mid Term								E 2015										

EN-0023   Surface Movement - Detail Operational Concept

Description: A detail operational concept will be developed based on a policy decision regarding appropriate roles and responsibilities for humans vs. automation and for flight operators vs. Air Navigation Service Providers (ANSPs) in supporting safe and efficient low-visibility surface movement at high density airports.

SOPR: FAA	*Primary Supported OIs:* OI-0322, OI-0400, OI-0401
SOCR:	*Primary Supported Enablers:* EN-0100

Enabler Group: Surface Movement Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0023: Surface Movement - Detail Operational Concept				E 2011														
R-1430: Applied Research on Human/Automation Roles in High-Density Surface Operations		R 2009																
R-0610: Applied Research on Safe Taxi Operations in Low Visibility Conditions		R 2009																
D-0880: Terminal and Surface Low Visibility ConOps		D 2009																
PI-0005: Public Acceptance of Automation			P 2010															
PI-0006: Balance of Human vs. Automation			P 2010															

EN-0026   Surface Movement Decision Support - Level 2 Mid Term

Description: Automation to enable safe and efficient flow of aircraft and ground equipment on the surface. This includes decision support automation for efficient flow management, real-time information distribution, such as runway braking action reports, and ground-based runway incursion detection and alerting.

SOPR: FAA	*Primary Supported OIs:* OI-0327, OI-0332
SOCR:	*Primary Supported Enablers:* EN-0022

Enabler Group: Surface Movement Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0026: Surface Movement Decision Support - Level 2 Mid Term								E 2015										
EN-6020: Environmentally Improved Surface Operations - Level 1 - Initial			E 2010															
EN-0100: Surface Movement Decision Support - Level 1 Initial				E 2011														
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-1206: Air - Ground Data Exchange – Clearance and Instruction Services – Tower Group 1					E 2012													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-1510: Integrated Surveillance Information Service Level 2								E 2015										
D-0880: Terminal and Surface Low Visibility ConOps						D 2013												
PI-0004: ATM Automation Development, Performance and Interoperability Standards						P 2013												

EN-0027   Metroplex Flow Management Decision Support

Description: Metroplex airspace planning and traffic flow management automation for midterm. Includes planning systems to optimize arrival and departure flow strategies for current and forecast weather conditions as well as scheduling automation to manage individual aircraft in flows, such as assigning each arriving or departing aircraft to an appropriate runway, arrival or departure stream, and place in sequence.

   SOPR: FAA   *Primary Supported OIs:* OI-0331, OI-0338, OI-0339, OI-0348

   SOCR: *Primary Supported Enablers:*

Enabler Group: Integrated Operation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0027: Metroplex Flow Management Decision Support											E 2018							
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
R-0640: Applied Research on Metroplex Throughput Optimization									R 2016									

EN-0028   Avionics - Access to Airspace Boundary Information

Description: Aircraft operator has real-time onboard access to information on boundaries and performance requirements for airspace, including arrival, departure, and other high-density route structures, Special Use Airspace (SUAs), flow corridors, and self-separation airspace.

   SOPR: FAA   *Primary Supported OIs:* OI-0361, OI-0362, OI-0365, OI-0366, OI-0368

   SOCR: *Primary Supported Enablers:*

Enabler Group: Avionics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0028: Avionics - Access to Airspace Boundary Information				E 2011														
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
PI-0014: Aircraft Equipage Implementation Policy		P 2009																
PI-0115: NextGen Safety Assessment/Certification - Synchronization of Aircraft and ANS			P 2010															

EN-0029   Wake Detection/Prediction w/Dynamic Wake Spacing - Level 1 Wake Drift

Description: Development and validation of a ground-based wake vortex advisory system based solely on wake transport. Standards are developed for safe wake spacing for various meteorological conditions, based on wake transport only. This does not include integration of the system into Air Navigation Service Providers (ANSP) tools and procedures.

   SOPR: FAA   *Primary Supported OIs:*

   SOCR: *Primary Supported Enablers:* EN-0030, EN-0151, EN-5047

Enabler Group: Wake Management Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0029: Wake Detection/Prediction w/Dynamic Wake Spacing - Level 1 Wake Drift							E 2014											
EN-1273: NextGen Weather Information Services - FAA Group 1				E 2011														
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
D-1680: Advanced Wake Sensing Capabilities					D 2012													

EN-0030   Wake Detection/Prediction w/Dynamic Wake Spacing - Level 2 Wake Drift/Decay

Description: Development and validation of a ground-based wake vortex advisory system based on wake transport and decay. Standards development for safe wake spacing for various meteorological conditions, based on wake transport and decay. This does not include integration of the system into Air Navigation Service Providers (ANSP) tools and procedures.

SOPR: FAA *Primary Supported OIs:* OI-0402, OI-0403

SOCR: *Primary Supported Enablers:* EN-0152

Enabler Group: Wake Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0030: Wake Detection/Prediction w/Dynamic Wake Spacing - Level 2 Wake Drift/Decay									E 2016									
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-0029: Wake Detection/Prediction w/Dynamic Wake Spacing - Level 1 Wake Drift							E 2014											
D-1640: Wind-Dependent Wake Vortex Arrival Procedures and Tools							D 2014											
D-1680: Advanced Wake Sensing Capabilities							D 2014											

EN-0031   Avionics - Airborne Merging and Spacing

Description: Development, validation, and implementation of aircraft technologies and procedures for airborne merging and spacing capability to meet requirements for all NextGen en route and terminal area merging and spacing applications (single-runway, complex and metroplex terminal area ops, dynamic spacing assigned by ground automation, en route merging and spacing in constrained environments, and flow corridor entry, exit, station-keeping and passing operations).

SOPR: FAA *Primary Supported OIs:* OI-0326, OI-0355, OI-0361, OI-0362, OI-0363, OI-0368, OI-0409, OI-0410

SOCR: *Primary Supported Enablers:*

Enabler Group: Avionics Enablers

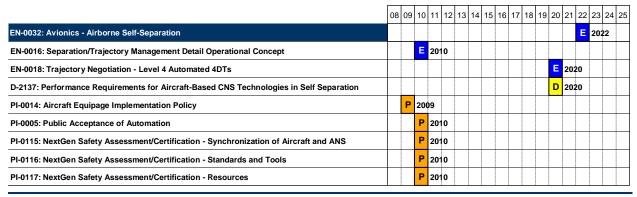|	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0031: Avionics - Airborne Merging and Spacing						E 2013												
EN-0200: Avionics - Traffic Display Level 2				E 2011														
EN-0204: Avionics - Traffic Collision and Avoidance System - Level 2				E 2011														
R-0500: Applied Research on Variable Separation Standards				R 2011														
D-0920: Traffic Spacing Management Components in Terminal and Transition Airspace				D 2011														
PI-0014: Aircraft Equipage Implementation Policy		P 2009																
PI-0115: NextGen Safety Assessment/Certification - Synchronization of Aircraft and ANS			P 2010															
PI-0116: NextGen Safety Assessment/Certification - Standards and Tools			P 2010															
PI-0117: NextGen Safety Assessment/Certification - Resources			P 2010															

Enabler Listing

EN-0032   Avionics - Airborne Self-Separation

Description: Development, validation, and implementation of aircraft technologies and procedures, including those for wake turbulence separation, for airborne separation capability to meet requirements for all NextGen airborne separation applications (airborne self-separation airspace operations, including entry and exit, and delegated airborne separation operations in classic and Trajectory-Based Operations [TBO] airspace).

SOPR: Industry   *Primary Supported OIs:* OI-0362, OI-0363, OI-0369

SOCR: *Primary Supported Enablers:*

Enabler Group: Avionics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0032: Avionics - Airborne Self-Separation															E 2022			
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-0018: Trajectory Negotiation - Level 4 Automated 4DTs													E 2020					
D-2137: Performance Requirements for Aircraft-Based CNS Technologies in Self Separation													D 2020					
PI-0014: Aircraft Equipage Implementation Policy		P 2009																
PI-0005: Public Acceptance of Automation			P 2010															
PI-0115: NextGen Safety Assessment/Certification - Synchronization of Aircraft and ANS			P 2010															
PI-0116: NextGen Safety Assessment/Certification - Standards and Tools			P 2010															
PI-0117: NextGen Safety Assessment/Certification - Resources			P 2010															

EN-0033   Airspace/Capacity/Flow Contingency Management Decision Support - Level 1

Description: The initial suite of integrated Air Navigation Service Providers (ANSP) automated decision support tools that support the overall management of airspace capacity and flow contingency. These tools incorporate real-time system constraints to determine demand/capacity imbalances. The tools will define flow structure/strategies and flexible resource allocation of ANSP and capacity assets. Demand is projected from filed flight plans and demand forecasts. Capacity is projected from weather forecasts, current weather information, national defense and security needs, airport and other infrastructure status, and related information.

SOPR: FAA   *Primary Supported OIs:* OI-0303, OI-0305, OI-0307, OI-0310, OI-0337, OI-0350, OI-0351, OI-0358, OI-0361, OI-0408, OI-4500

SOCR: *Primary Supported Enablers:* EN-0036, EN-0207

Enabler Group: Capacity/Flow Contingency Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0033: Airspace/Capacity/Flow Contingency Management Decision Support - Level 1						E 2013												
EN-1231: NextGen Enterprise Network - FAA				E 2011														
EN-1270: Flow Information Services - FAA Group 1				E 2011														
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E 2011														
EN-1272: Aeronautical Information Services (AIS) - FAA Group 1				E 2011														
EN-1273: NextGen Weather Information Services - FAA Group 1				E 2011														
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-0301: Performance-Based Separation Standards and Procedures					E 2012													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
R-1620: Applied Research on Spacing Management in Congested En Route Airspace				R 2011														
R-1060: Applied Research on NextGen Team Size Optimization				R 2011														
R-1460: Applied Research on Common NextGen Automation Platform				R 2011														
D-0870: Mixed Equipage Trajectory-Based Routes and Advanced OPD Operations				D 2011														
D-1210: Technologies and Procedures for Dynamically Adjusting Airspace Structures				D 2011														

Enabler Listing

EN-0034   Trajectory Management Decision Support - Level 1

Description: The initial suite of integrated Air Navigation Service Providers (ANSP) automation tools that support the overall management of real-time Four Dimensional Trajectories (4DT) for all aircraft movements in en route and terminal domains. These tools incorporate demand, capacity and flow contingency strategies received from the integrated suite of ANSP tools with precise, real-time aircraft position and intent received from ground-based and airborne systems. These tools enhance the ANSP's ability to actively manage specific aircraft movements and the ANSP's ability to manage the overall flow of all aircraft. The Trajectory Management tools help ANSPs optimize the trajectory of each flight to meet airspace restrictions, capacity and flow contingency strategies balanced with the demand projected from requested flight plans or the pre-flight negotiated trajectory. During flight, the tools support the adjustment and management of trajectories to accommodate changing conditions such as weather events or airport congestion. The tools also provide trajectory information to the integrated ANSP suite to support the safe separation of each flight. Demand is projected from filed flight plans and demand forecasts. Capacity is projected from weather forecasts, current weather information, national defense and security needs, airport and other infrastructure status, and related information.

SOPR: FAA   *Primary Supported OIs:* OI-0307, OI-0330, OI-0331, OI-0333, OI-0337, OI-0350, OI-0351, OI-0361

SOCR: *Primary Supported Enablers:* EN-0017, EN-0037

Enabler Group: Trajectory Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0034: Trajectory Management Decision Support - Level 1						E 2013												
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-1251: Information Sharing Standards: Flight and Surveillance Information			E 2010															
EN-1231: NextGen Enterprise Network - FAA				E 2011														
EN-1270: Flow Information Services - FAA Group 1				E 2011														
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E 2011														
EN-1272: Aeronautical Information Services (AIS) - FAA Group 1				E 2011														
EN-1273: NextGen Weather Information Services - FAA Group 1				E 2011														
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-1006: Integrated Cooperative Surveillance Information - Level 1					E 2012													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
R-1620: Applied Research on Spacing Management in Congested En Route Airspace				R 2011														
R-1060: Applied Research on NextGen Team Size Optimization				R 2011														
R-1460: Applied Research on Common NextGen Automation Platform				R 2011														
D-2135: Air and Ground Separation Management Architecture				D 2011														
D-0870: Mixed Equipage Trajectory-Based Routes and Advanced OPD Operations				D 2011														
D-1200: Guidance for Trajectory-Based Procedures				D 2011														
PI-0004: ATM Automation Development, Performance and Interoperability Standards						P 2013												

Enabler Listing

EN-0035   Separation Management Decision Support - Level 1

Description: The initial suite of integrated Air Navigation Service Providers (ANSP) automated decision support tools that support the safe management and execution of separation procedures and standards in en route airspace. These tools incorporate real-time information from ground-based and aircraft systems that provide precise aircraft positions and trajectories. These tools enhance a controller's ability to ensure that aircraft are safely separated from potentially hazardous conflicts including other aircraft, wake turbulence, terrain, severe weather, restricted airspace, and obstacles. Separation management is integrated with Trajectory Management such that potential conflicts can be automatically detected. These decision support tools will recommend and support the execution of conflict resolutions that incorporate weather, airspace, and hazard information. Separation management may be the responsibility of the ANSP, or it may be delegated to the flight operator during specific operations.

SOPR: FAA	*Primary Supported OIs:* OI-0337, OI-0343, OI-0349, OI-0350, OI-0353, OI-0354, OI-0355, OI-0356, OI-0358, OI-0359, OI-0361
SOCR:	*Primary Supported Enablers:* EN-0038

Enabler Group: Separation Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0035: Separation Management Decision Support - Level 1						E 2013												
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-1231: NextGen Enterprise Network - FAA				E 2011														
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E 2011														
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-0301: Performance-Based Separation Standards and Procedures					E 2012													
EN-0212: Parameter Driven Aircraft Separation Standards and Procedures						E 2013												
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
R-1620: Applied Research on Spacing Management in Congested En Route Airspace				R 2011														
R-1060: Applied Research on NextGen Team Size Optimization				R 2011														
R-1460: Applied Research on Common NextGen Automation Platform				R 2011														
R-1230: Applied Research on Weather and Wake Impacts for En Route Operations				R 2011														
D-0830: Trajectory Negotiation Protocols for Air and Ground Information Architectures				D 2011														
D-2135: Air and Ground Separation Management Architecture				D 2011														
D-1200: Guidance for Trajectory-Based Procedures				D 2011														
PI-0022: GPS Policy to Support Civil NextGen PNT Requirements			P 2010															

EN-0036   Airspace/Capacity/Flow Contingency Management Decision Support - Level 2 Limited Dynamic

Description: Enhancements to the integrated suite Air Navigation Service Providers (ANSP) automated decision support tools that support the overall management of airspace capacity and flow contingency. These enhancements provide more dynamic management capabilities including the identification of demand/capacity imbalances, defining and supporting the execution of airspace and flow strategies to mitigate situations when the desired use of capacity cannot be accommodated, as well as strategies to take advantage of aircraft equipage to maximize efficient use of airspace. These tools support strategic and tactical collaboration between ANSP and airspace operators including collaboration on flow programs and procedures that will shift demand to alternate resources such as new routings, altitudes, and times.

SOPR: FAA	*Primary Supported OIs:* OI-0362, OI-0406, OI-4502
SOCR:	*Primary Supported Enablers:* EN-0180

Enabler Group: Capacity/Flow Contingency Management Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0036: Airspace/Capacity/Flow Contingency Management Decision Support - Level 2 Limited											E 2018							
EN-0033: Airspace/Capacity/Flow Contingency Management Decision Support - Level 1						E 2013												
EN-5008: Ground Congestion Data Feed to Airport Acceptance Rate								E 2015										
EN-2681: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 2										E 2017								
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E 2018							
R-1620: Applied Research on Spacing Management in Congested En Route Airspace									R 2016									
R-1630: Applied Research on Flow Corridor Operational Concepts									R 2016									
D-0420: NAS-Wide Aggregate Flow Models									D 2016									
PI-0001: Airport Operation Centers (AOC) Equipage Implementation Policy						P 2013												

EN-0037   Trajectory Management Decision Support - Level 2

Description: Enhancements to the suite of integrated ANSP automation tools that support the management of real-time Four Dimensional Trajectories (4DTs) for all aircraft movements in en route and terminal domains. These enhancements include the addition of algorithms, data collection and communication abilities that support trajectory management of: complex merging and spacing in en route and metroplex environments, dynamic airspace reconfiguration, flow corridors, and full trajectory management from gate to gate. The suite is also enhanced to support dynamic incorporation of capacity and flow contingency strategies and real-time changes in capacity factors such as probabilistic weather information, national defense and security needs, airport and other infrastructure status, and related information. The suite of tools support dynamic and real-time collaboration of specific trajectories between service providers and flight operators .

SOPR: FAA   *Primary Supported OIs:* OI-0338, OI-0341, OI-0348, OI-0363, OI-0365, OI-0368, OI-0369, OI-0406

SOCR: *Primary Supported Enablers:* EN-0018

Enabler Group: Trajectory Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0037: Trajectory Management Decision Support - Level 2											E 2018							
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-0034: Trajectory Management Decision Support - Level 1						E 2013												
EN-1506: Integrated Cooperative Surveillance Information - Level 2								E 2015										
EN-2681: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 2										E 2017								
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E 2018							
R-1620: Applied Research on Spacing Management in Congested En Route Airspace									R 2016									
D-2135: Air and Ground Separation Management Architecture									D 2016									
D-0520: Trajectory Prediction Methodologies for New Vehicle Classes									D 2016									
D-1200: Guidance for Trajectory-Based Procedures									D 2016									
PI-0001: Airport Operation Centers (AOC) Equipage Implementation Policy						P 2013												

Enabler Listing

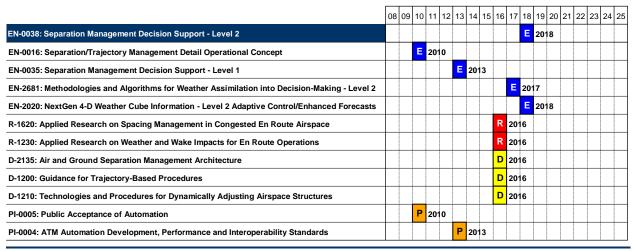### EN-0038   Separation Management Decision Support - Level 2

Description: Enhancements to the integrated Air Navigation Service Provider (ANSP) automated decision support tools that support the safe management and execution of advanced separation procedures and standards. These enhancements include support of more complex dynamic wake management, delegated separation, self-separation and integrated trajectory management procedures and standards. The enhancements also include the extension of advanced separation management support for all airspace domains including terminal and oceanic. The separation management decision support tools are enhanced to integrate with the full suite of trajectory, capacity and flow contingency management support tools using a net-centric infrastructure and system wide information management providing full situational awareness of aircraft, airspace, weather and all elements needed for comprehensive separation management. The responsibility for separation management will be negotiated and delegated among ANSP and flight operations for all operations.

SOPR: FAA   *Primary Supported OIs:* OI-0348, OI-0360, OI-0362, OI-0363, OI-0368, OI-0370

SOCR: *Primary Supported Enablers:*

Enabler Group: Separation Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0038: Separation Management Decision Support - Level 2											E 2018							
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-0035: Separation Management Decision Support - Level 1						E 2013												
EN-2681: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 2										E 2017								
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E 2018							
R-1620: Applied Research on Spacing Management in Congested En Route Airspace									R 2016									
R-1230: Applied Research on Weather and Wake Impacts for En Route Operations									R 2016									
D-2135: Air and Ground Separation Management Architecture									D 2016									
D-1200: Guidance for Trajectory-Based Procedures									D 2016									
D-1210: Technologies and Procedures for Dynamically Adjusting Airspace Structures									D 2016									
PI-0005: Public Acceptance of Automation			P 2010															
PI-0004: ATM Automation Development, Performance and Interoperability Standards					P 2013													

EN-0039   UAS Detail Operation Concept

Description: A policy decision will be made regarding how Unmanned Aircraft System (UAS) operations will be incorporated in the national airspace system. This decision includes standards for separation of UASs from other aircraft, procedures for UAS operations, requirements for onboard equipment, such as sense and avoid systems, and may encompass a set of standards for UASs with various performance and operational characteristics and equipage.

SOPR: FAA   *Primary Supported OIs:* OI-0343, OI-0349, OI-0363, OI-0369, OI-0406
SOCR: *Primary Supported Enablers:*

Enabler Group: Separation Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0039: UAS Detail Operation Concept					E 2012													
R-1190: Applied Research on Certification Methods, Requirements, and Standards for UASs			R 2010															
R-1370: Applied Research on the Operational Concept for UASs in Trajectory-Based Airspace			R 2010															
D-0520: Trajectory Prediction Methodologies for New Vehicle Classes			D 2010															
PI-0005: Public Acceptance of Automation			P 2010															

Enabler Listing

EN-0100   Surface Movement Decision Support - Level 1 Initial

Description: Automation to enable safe and efficient flow of aircraft on the surface. This includes decision support automation for efficient flow management.

SOPR: FAA   *Primary Supported OIs:* OI-0321
SOCR: *Primary Supported Enablers:* EN-0026

Enabler Group: Surface Movement Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0100: Surface Movement Decision Support - Level 1 Initial				E 2011														
EN-0023: Surface Movement - Detail Operational Concept				E 2011														
EN-1231: NextGen Enterprise Network - FAA				E 2011														
R-1460: Applied Research on Common NextGen Automation Platform		R 2009																
D-0880: Terminal and Surface Low Visibility ConOps		D 2009																

EN-0101   Avionics - Enhanced Obstacle Detection

Description: Enhanced vision systems for acquisition of runway environment and obstacles, such as Forward Looking Infra Red (FLIR).

SOPR: FAA   *Primary Supported OIs:* OI-0317, OI-0340, OI-0381, OI-0409, OI-0410
SOCR: *Primary Supported Enablers:*

Enabler Group: Avionics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0101: Avionics - Enhanced Obstacle Detection										E 2017								
D-2133: Air and Ground-based Runway Incursion Detection Technology								D 2015										
D-2125: Situational Awareness Technologies in Low-Visibility and Surface Operations								D 2015										
PI-0014: Aircraft Equipage Implementation Policy		P 2009																

EN-0102   Avionics - Moving Map Display

Description: Globally harmonized electronic map and display of airport ramps, taxiways, and runways showing real-time own-ship position, and cooperating surface traffic and ground vehicles.

SOPR: Industry   *Primary Supported OIs:* OI-0317, OI-0340
SOCR: *Primary Supported Enablers:* EN-0109

Enabler Group: Avionics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0102: Avionics - Moving Map Display				E 2011														
EN-1160: Space Based Navigation System - GPS Legacy	E 2008																	
D-2125: Situational Awareness Technologies in Low-Visibility and Surface Operations		D 2009																
PI-0014: Aircraft Equipage Implementation Policy		P 2009																
PI-0115: NextGen Safety Assessment/Certification - Synchronization of Aircraft and ANS			P 2010															
PI-0116: NextGen Safety Assessment/Certification - Standards and Tools			P 2010															
PI-0117: NextGen Safety Assessment/Certification - Resources			P 2010															

Enabler Listing

EN-0103   Avionics - Trajectory Management - Arrival/Departure

Description: A device/display that will assist aircraft in the coordination and execution of trajectory management using precision navigation, cooperative surveillance, onboard algorithms, and displays that allow the reduction of lateral separation requirements.

>   *SOPR:* Industry   *Primary Supported OIs:* OI-0334, OI-0368
>   *SOCR:*   *Primary Supported Enablers:* EN-0009

Enabler Group: Avionics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0103: Avionics - Trajectory Management - Arrival/Departure								E 2015										
D-0330: Aircraft-Based Precision Approach Capability						D 2013												
PI-0014: Aircraft Equipage Implementation Policy		P 2009																
PI-0115: NextGen Safety Assessment/Certification - Synchronization of Aircraft and ANS			P 2010															
PI-0116: NextGen Safety Assessment/Certification - Standards and Tools			P 2010															
PI-0117: NextGen Safety Assessment/Certification - Resources			P 2010															

EN-0106   Avionics - Delegated Separation Acknowledgement Information

Description: Device/Display enabling separation operations, to include both a single aircraft having separation authority for a specific maneuver (e.g., for crossing or passing another aircraft) or more general separation responsibility, such as for flow corridors. This will allow the Air Navigation Service Provider (ANSP) and aircraft automation to track the delegation of responsibility and its limits and ensure that the delegation is always unambiguous and clearly communicated.

>   *SOPR:* Industry   *Primary Supported OIs:* OI-0332, OI-0334, OI-0337, OI-0353, OI-0354,
>   OI-0356, OI-0359, OI-0361, OI-0409, OI-0410
>   *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Avionics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0106: Avionics - Delegated Separation Acknowledgement Information							E 2014											
EN-1700: Cooperative Surveillance - ADS-C	E 2008																	
EN-0201: Avionics - RNP		E 2009																
EN-0200: Avionics - Traffic Display Level 2				E 2011														
D-0330: Aircraft-Based Precision Approach Capability					D 2012													
PI-0014: Aircraft Equipage Implementation Policy		P 2009																
PI-0005: Public Acceptance of Automation			P 2010															
PI-0115: NextGen Safety Assessment/Certification - Synchronization of Aircraft and ANS			P 2010															

EN-0109   Avionics - Surface Conflict Management

Description: Aircraft equipage that will enable trajectory-based procedures used on the surface at high-density airports to expedite traffic and schedule active runway crossings. Aircraft will perform delegated separation procedures, especially in low-visibility conditions.

>   *SOPR:* Industry   *Primary Supported OIs:* OI-0331, OI-0332, OI-0410
>   *SOCR:*   *Primary Supported Enablers:* EN-0009

Enabler Group: Avionics Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0109: Avionics - Surface Conflict Management									E 2016									
EN-0102: Avionics - Moving Map Display				E 2011														
EN-0200: Avionics - Traffic Display Level 2				E 2011														
D-2133: Air and Ground-based Runway Incursion Detection Technology							D 2014											
PI-0014: Aircraft Equipage Implementation Policy		P 2009																
PI-0115: NextGen Safety Assessment/Certification - Synchronization of Aircraft and ANS			P 2010															
PI-0116: NextGen Safety Assessment/Certification - Standards and Tools			P 2010															
PI-0117: NextGen Safety Assessment/Certification - Resources			P 2010															

EN-0110　　　Trajectory Negotiation - Level 2 En Route Time-Based Metering

Description:　Enhancements to the integrated suite of the Air Navigation Service Provider's (ANSP) automation tools that support overall management of trajectory negotiation. These enhancements integrate Four Dimensional Trajectories (4DTs) with separation assurance to support the negotiation of a conflict free, time-based trajectory for an agreed-upon position, time, and altitude for an aircraft to begin its optimal vertical profile descent to the runway threshold. Ground automation considers aircraft capabilities in trajectory negotiation, including appropriate speed/altitude profiles. 4DTs may be communicated to the cockpit by voice or data. 4DTs are most likely negotiated while the aircraft is airborne. ANSP is responsible for separation unless otherwise delegated to the flight operators.

SOPR: FAA	*Primary Supported OIs:* OI-0325, OI-0330
SOCR:	*Primary Supported Enablers:* EN-0009, EN-0017

Enabler Group: Trajectory Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0110: Trajectory Negotiation - Level 2 En Route Time-Based Metering						E 2013												
EN-1032: Radio-Based Voice Network - Legacy VHF/UHF	E 2008																	
EN-1231: NextGen Enterprise Network - FAA				E 2011														
EN-1006: Integrated Cooperative Surveillance Information - Level 1					E 2012													
EN-0008: Trajectory Negotiation - Level 1 Controlled Time of Arrival (CTA)						E 2013												
R-0960: Applied Research on 4D Trajectory Evaluation, Planning, Presentation and Negotiation				R 2011														
D-0830: Trajectory Negotiation Protocols for Air and Ground Information Architectures				D 2011														
D-0400: Time-Based Metering of Flows Transitioning into High-Density Terminal Areas				D 2011														
D-1200: Guidance for Trajectory-Based Procedures				D 2011														
PI-0004: ATM Automation Development, Performance and Interoperability Standards						P 2013												

EN-0150　　　Wake Vortex Configuration Advisory Decision Support - Level 1 Static Drift Only

Description:　An Air Navigation Service Provider (ANSP) decision support tool utilizing current and predicted weather information, such as wind, to determine whether persistently favorable conditions are forecast allowing a safe reduction in spacing requirements.

SOPR: FAA	*Primary Supported OIs:* OI-0400, OI-0401
SOCR:	*Primary Supported Enablers:* EN-0151

Enabler Group: Wake Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0150: Wake Vortex Configuration Advisory Decision Support - Level 1 Static Drift Only					E 2012													
EN-1231: NextGen Enterprise Network - FAA				E 2011														
EN-1273: NextGen Weather Information Services - FAA Group 1				E 2011														
D-1640: Wind-Dependent Wake Vortex Arrival Procedures and Tools			D 2010															

Enabler Listing

EN-0151   Wake Vortex Configuration Advisory Decision Support - Level 2 Dynamic Drift

Description: An Air Navigation Service Provider (ANSP) decision support tool utilizing current and predicted weather information, such as wind, to determine dynamic adjustments to longitudinal spacing, based on wake drift prediction.

SOPR: FAA   *Primary Supported OIs:*
SOCR: *Primary Supported Enablers:* EN-0152

Enabler Group: Wake Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0151: Wake Vortex Configuration Advisory Decision Support - Level 2 Dynamic Drift							E 2014											
EN-0150: Wake Vortex Configuration Advisory Decision Support - Level 1 Static Drift Only					E 2012													
EN-0029: Wake Detection/Prediction w/Dynamic Wake Spacing - Level 1 Wake Drift							E 2014											
D-1640: Wind-Dependent Wake Vortex Arrival Procedures and Tools					D 2012													
D-0890: Dynamic Wake Management for Single Runway Operations					D 2012													

EN-0152   Wake Vortex Configuration Advisory Decision Support - Level 3 Dynamic Drift/Decay

Description: An Air Navigation Service Provider (ANSP) decision support tool utilizing current and predicted weather information, such as wind, to determine dynamic adjustments to longitudinal spacing, based on wake drift and decay prediction.

SOPR: FAA   *Primary Supported OIs:* OI-0348, OI-0402, OI-0403
SOCR: *Primary Supported Enablers:* EN-5043

Enabler Group: Wake Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0152: Wake Vortex Configuration Advisory Decision Support - Level 3 Dynamic Drift/Decay									E 2016									
EN-0151: Wake Vortex Configuration Advisory Decision Support - Level 2 Dynamic Drift							E 2014											
EN-0030: Wake Detection/Prediction w/Dynamic Wake Spacing - Level 2 Wake Drift/Decay									E 2016									
D-1640: Wind-Dependent Wake Vortex Arrival Procedures and Tools							D 2014											
D-0890: Dynamic Wake Management for Single Runway Operations							D 2014											

EN-0160   Oceanic Web Enabled Collaborative Trajectory Planning

Description: Oceanic Web Enabled Collaborative Trajectory Planning provides the ability for Aircraft Dispatchers and Traffic Flow Managers to collaborate on oceanic trajectory planning, to include climbs, entry times and track loading prior to departure using the web.

SOPR: FAA   *Primary Supported OIs:* OI-0304
SOCR: *Primary Supported Enablers:*

Enabler Group: Oceanic Operations Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0160: Oceanic Web Enabled Collaborative Trajectory Planning		E 2009																
D-2131: Required Oceanic Flight Profile Information	D 2007																	

EN-0161   Oceanic Trajectory - 4DT En Route

Description: The ability for Aircraft Operators to send their desired oceanic Four-Dimensional Trajectory (4DT) profile adjustments real-time. Aircraft Dispatchers and Traffic Flow Managers can continually examine and send predicted desired profiles using ground automation to enhance oceanic capacity.

SOPR: FAA   *Primary Supported OIs:* OI-0304
SOCR: *Primary Supported Enablers:*

Enabler Group: Oceanic Operations Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0161: Oceanic Trajectory - 4DT En Route		E 2009																
D-2131: Required Oceanic Flight Profile Information	D 2007																	

EN-0162   Development of Flexible Oceanic Entry Points

Description: The development of Flexible Oceanic Entry Points will provide Aircraft Dispatchers and Traffic Flow Managers the flexibility to adjust the Oceanic entry points. This will require web enabled collaborative Four-Dimensional Trajectory (4DT) planning.

  SOPR: FAA   *Primary Supported OIs:* OI-0304

  SOCR: *Primary Supported Enablers:*

Enabler Group: Oceanic Operations Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0162: Development of Flexible Oceanic Entry Points				E 2011														
D-0150: Collaborative Negotiation Capabilities for Expanded Oceanic Track Entry Points		D 2009																

EN-0168   In-Trail Oceanic Separation Using ADS-C

Description: Automatic Dependent Surveillance-Contract (ADS-C) is used operationally in oceanic airspace to manage in-trail separation. ADS-C is a data interaction between flight crew and Air Navigation Service Provider (ANSP) by which they agree on a simple trajectory and the aircraft periodically reports its position and other information. ANSP uses this trajectory and position information to monitor and manage oceanic traffic separation.

  SOPR: FAA   *Primary Supported OIs:* OI-0353, OI-0354

  SOCR: *Primary Supported Enablers:*

Enabler Group: Separation Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0168: In-Trail Oceanic Separation Using ADS-C							E 2014											
EN-1750: Radio Data Link: Legacy Satcom	E 2008																	

EN-0169   In-Trail Oceanic Separation Using ADS-B

Description: Automatic Dependent Surveillance-Broadcast (ADS-B) is used operationally in oceanic airspace to manage in-trail separation. ADS-B typically (over land) uses Mode Select Beacon System (Mode S) communications protocols and frequencies. However, Mode S is not appropriate for oceanic communications between flight crew and the Air Navigation Service Provider (ANSP) (there are no 'ground stations' in range). Therefore, this enabler requires transmitting ADS-B data over satellite communications or some other solution for the oceanic environment. ANSP uses this position information to monitor and manage oceanic traffic separation.

  SOPR: FAA   *Primary Supported OIs:* OI-0353, OI-0354

  SOCR: *Primary Supported Enablers:*

Enabler Group: Separation Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0169: In-Trail Oceanic Separation Using ADS-B							E 2014											
EN-1750: Radio Data Link: Legacy Satcom	E 2008																	

EN-0170   SUA Management Decision Support - Level 1

Description: Automated decision support tools and procedures to improve the scheduling and management of Special Use Airspace (SUA). The automation and procedures will allow collaboration between stakeholders to exchange airspace demands, capacities, and constraints. It provides initial real-time scheduling functions of SUA that increases access for non-military users, improves system efficiency, and meets military operational needs.

  SOPR: FAA   *Primary Supported OIs:* OI-0346

  SOCR: *Primary Supported Enablers:* EN-0171, EN-0206

Enabler Group: Capacity/Flow Contingency Management Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0170: SUA Management Decision Support - Level 1		E 2009																
D-0010: Coordination and Dissemination Requirements for SUAs	D 2007																	

EN-0171   SUA Management Decision Support - Level 2

Description: Automated decision support tools and procedures that provide advanced scheduling and management of Special Use Airspace (SUA). The automation and procedures provide integrated information of SUA utilization, demand, capacity, and system constraints including probabilistic weather. This information enables the Air Navigation Service Providers (ANSP) to dynamically schedule SUA when not in use by the military and configure the efficient and flexible use of airspace to increase capacity and improve civilian use of SUA. The automation supports rapid processing of requests and allocation of airspace to minimize disruptions to civil aviation while continuing to meet military operational needs.

    SOPR: FAA   *Primary Supported OIs:* OI-0365, OI-0365, OI-0406

    SOCR: *Primary Supported Enablers:* EN-0207

Enabler Group: Capacity/Flow Contingency Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0171: SUA Management Decision Support - Level 2						E 2013												
EN-0170: SUA Management Decision Support - Level 1		E 2009																
EN-1270: Flow Information Services - FAA Group 1				E 2011														
EN-1272: Aeronautical Information Services (AIS) - FAA Group 1				E 2011														
D-0010: Coordination and Dissemination Requirements for SUAs				D 2011														

EN-0180   Airspace/Capacity/Flow Contingency Management Decision Support - Level 3 Dynamic

Description: Enhancements to the integrated suite Air navigation Service Provider's (ANSP) automated decision support tools that support the overall management of airspace capacity and flow contingency. These enhancements provide a broad range of dynamic management capabilities to support the full functions of Trajectory-Based Operations (TBO), the dynamic management of airspace classification and configuration, as well as the planning and management of restricted airspace and flow corridors.

    SOPR: FAA   *Primary Supported OIs:* OI-0365, OI-0366, OI-0368, OI-0370, OI-4512

    SOCR: *Primary Supported Enablers:*

Enabler Group: Capacity/Flow Contingency Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0180: Airspace/Capacity/Flow Contingency Management Decision Support - Level 3 Dynamic															E 2022			
EN-0036: Airspace/Capacity/Flow Contingency Management Decision Support - Level 2 Limited											E 2018							
R-1620: Applied Research on Spacing Management in Congested En Route Airspace													R 2020					
R-1630: Applied Research on Flow Corridor Operational Concepts													R 2020					
D-0420: NAS-Wide Aggregate Flow Models													D 2020					
D-1210: Technologies and Procedures for Dynamically Adjusting Airspace Structures													D 2020					

EN-0200   Avionics - Traffic Display Level 2

Description: Display/Device that allow an aircraft to augment out-the-window visual separation information with onboard traffic information on a visual approach. This will also allow multiple aircraft on the runway simultaneously for specific operations.

    SOPR: Industry   *Primary Supported OIs:* OI-0316, OI-0341

    SOCR: *Primary Supported Enablers:* EN-0031, EN-0106, EN-0109

Enabler Group: Avionics Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0200: Avionics - Traffic Display Level 2				E 2011														
EN-0202: Avionics - Traffic Display Level 1 Cockpit Display of Traffic Information (CDTI)	E 2008																	
EN-1400: Cooperative Surveillance - ADS-B IN/TIS-B/FIS-B Level 1			E 2010															
PI-0014: Aircraft Equipage Implementation Policy		P 2009																

EN-0201   Avionics - RNP

Description: Required Navigation Performance (RNP) is a set of standards that allow the navigation of routes and flight paths with a specific level of precision. For aircraft to operate within a defined airspace, such as "Super Density Airspace", they may be required to perform at the RNP levels of precision defined for that airspace. To operate at specific levels, aircraft must maintain adherence to a flight path, monitor the achieved performance, and provide an alert in the event that this fails to meet the specification. To operate at specific levels, aircraft will also require avionics that may include specific combinations of flight management systems, navigation sensors, flight guidance systems, cockpit displays and other equipment as required.

SOPR: FAA   *Primary Supported OIs:* OI-0310, OI-0311, OI-0344, OI-0348, OI-0350, OI-0353, OI-0354

SOCR: *Primary Supported Enablers:* EN-0106

Enabler Group: Avionics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0201: Avionics - RNP		E 2009																
EN-1160: Space Based Navigation System - GPS Legacy	E 2008																	
PI-0120: PNT Performance Requirements	P 2008																	
PI-0014: Aircraft Equipage Implementation Policy		P 2009																

EN-0202   Avionics - Traffic Display Level 1 Cockpit Display of Traffic Information (CDTI)

Description: Refers to flight crew knowledge of nearby traffic depicted on a cockpit traffic display without any change of separation tasks or responsibility.

SOPR: FAA   *Primary Supported OIs:* OI-0353, OI-0354

SOCR: *Primary Supported Enablers:* EN-0200

Enabler Group: Avionics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0202: Avionics - Traffic Display Level 1 Cockpit Display of Traffic Information (CDTI)	E 2008																	

EN-0203   Avionics - Traffic Collision and Avoidance System - Level 1

Description: The Traffic Collision and Avoidance System (TCAS) is a computerized avionics device which is designed to reduce the danger of mid-air collisions between aircraft. It monitors the airspace around an aircraft, independent of air traffic control, and warns pilots of the presence of other aircraft which may present a threat of Mid-Air Collision (MAC).

SOPR: FAA   *Primary Supported OIs:* OI-0344

SOCR: *Primary Supported Enablers:* EN-0204

Enabler Group: Avionics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0203: Avionics - Traffic Collision and Avoidance System - Level 1	E 2008																	
D-2147: Airborne Collision Avoidance Back-up System	D 2006																	

Enabler Listing

EN-0204   Avionics - Traffic Collision and Avoidance System - Level 2

Description: The Traffic Collision and Avoidance System (TCAS) is a computerized avionics device which is designed to reduce the danger of mid-air collisions between aircraft. It monitors the airspace around an aircraft, independent of air traffic control, and warns pilots of the presence of other aircraft which may present a threat of Mid-Air Collision (MAC). It offers all the benefits of TCAS I, but will also offer the pilot direct, vocalized instructions to avoid danger, known as a "Resolution Advisory".

> **SOPR:** FAA   **Primary Supported OIs:** OI-0356, OI-0359, OI-0362, OI-0363, OI-0369
>
> **SOCR:**   **Primary Supported Enablers:** EN-0031

Enabler Group: Avionics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0204: Avionics - Traffic Collision and Avoidance System - Level 2				E	2011													
EN-0203: Avionics - Traffic Collision and Avoidance System - Level 1	E	2008																
D-2147: Airborne Collision Avoidance Back-up System		D	2009															
PI-0014: Aircraft Equipage Implementation Policy		P	2009															

EN-0206   Consolidated Aeronautical Information - Level 1 Network-Enabled Legacy

Description: Automated, net-centric systems that provide aeronautical information including scheduled use of Special Use Airspace (SUA), Temporary Flight Restrictions (TFRs), and flow restricted airspace. These systems support improved civilian flight planning and airspace utilization. Air Navigation Service Provider's (ANSP) use the information to more efficiently manage the airspace and help resolve en route flow problems caused by weather or traffic congestion.

> **SOPR:** FAA   **Primary Supported OIs:** OI-0346, OI-0408
>
> **SOCR:**   **Primary Supported Enablers:** EN-0207

Enabler Group: Aeronautical Information Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0206: Consolidated Aeronautical Information - Level 1 Network-Enabled Legacy				E	2011													
EN-0170: SUA Management Decision Support - Level 1		E	2009															
EN-1231: NextGen Enterprise Network - FAA				E	2011													
EN-1270: Flow Information Services - FAA Group 1				E	2011													
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E	2011													
EN-1272: Aeronautical Information Services (AIS) - FAA Group 1				E	2011													

EN-0207   Consolidated Aeronautical Information - Level 2 Integrated Status

Description: Automated, real-time net-centric systems provide aeronautical information including Special Use Airspace (SUA), Temporary Flight Restrictions (TFRs), flow restricted airspace, and weather data from the initial Four-Dimensional (4D) Weather Cube capability as well as demand and capacity predictions, to a variety of government, military and civilian agencies, including general and commercial aviation. This information will allow airspace users to more efficiently plan pre-flight and in-flight routing and enable better civilian use of SUA when not in use by the military. This will enable Air Navigation Service Provider's (ANSP) to more efficiently manage the airspace and better resolve en route flow problems, targeting only those flights predicted to be affected by constrained areas, caused by weather or traffic congestion.

> **SOPR:** FAA   **Primary Supported OIs:** OI-0303, OI-0306, OI-0337, OI-0351, OI-0365, OI-0408
>
> **SOCR:**   **Primary Supported Enablers:** EN-0003

Enabler Group: Aeronautical Information Management Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0207: Consolidated Aeronautical Information - Level 2 Integrated Status						E 2013												
EN-0206: Consolidated Aeronautical Information - Level 1 Network-Enabled Legacy				E 2011														
EN-0033: Airspace/Capacity/Flow Contingency Management Decision Support - Level 1						E 2013												
EN-0171: SUA Management Decision Support - Level 2						E 2013												
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												

EN-0210   Flexible Routing Flight Plan Automation - Operator

Description: Aircraft equipage allowing unrestricted routing except when Trajectory Management or separation management by Air Navigation Service Provider's (ANSP) deem the congestion level to warrant more structure. The flexibility will enable pre-flight rerouting to resolve en route flow problems caused by weather or traffic congestion. Flight operators will file multiple flight plan intent messages and the ANSP will select the one that most efficiently meets flow management and flight operator goals.

> *SOPR:* FAA
> *SOCR:*

Primary Supported OIs: OI-0350, OI-0408
Primary Supported Enablers:

Enabler Group: Flight Planning and Data Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0210: Flexible Routing Flight Plan Automation - Operator				E 2011														
D-0870: Mixed Equipage Trajectory-Based Routes and Advanced OPD Operations		D 2009																

EN-0212   Parameter Driven Aircraft Separation Standards and Procedures

Description: Separation management standards and procedures that allow Air Navigation Service Provider's (ANSP) and flight operators to safely manage separation using aircraft parameters and operating conditions. Safe separation standards and procedures will reflect aircraft capabilities, wake turbulence characteristics, operational geometries, and environmental conditions.

> *SOPR:* FAA
> *SOCR:*

Primary Supported OIs: OI-0349
Primary Supported Enablers: EN-0035

Enabler Group: Separation Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0212: Parameter Driven Aircraft Separation Standards and Procedures						E 2013												
EN-0016: Separation/Trajectory Management Detail Operational Concept				E 2010														
R-2114: Applied Research on Improved Weather Sensing and Forecasting Models					R 2011													
R-1230: Applied Research on Weather and Wake Impacts for En Route Operations					R 2011													
R-0600: Applied Research on Assessing and Predicting Wake Severity					R 2011													
R-2126: Applied Research on Airframe Designs to Accelerate Wake Vortex Decay					R 2011													
D-1640: Wind-Dependent Wake Vortex Arrival Procedures and Tools					D 2011													
D-1680: Advanced Wake Sensing Capabilities					D 2011													
D-0890: Dynamic Wake Management for Single Runway Operations					D 2011													

EN-0300   Networked Air Navigation Support Facilities

Description: New co-located air navigation support facilities are created that allow flexible management of airspace and air traffic operations using advanced systems, networks and processes. These facilities may support combined or individual en route or terminal operations as needed by the demands of the Air Navigation Service Provider (ANSP).

> *SOPR:* FAA
> *SOCR:*

Primary Supported OIs: OI-0307, OI-0361
Primary Supported Enablers:

Enabler Group: Capacity/Flow Contingency Management Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0300: Networked Air Navigation Support Facilities								E 2015										
EN-1180: Ground Integrated Voice/Data Network - Level 1	E 2008																	
EN-1016: Enterprise Networks Infrastructure Services Standards				E 2011														
EN-1043: Enterprise Networks Security Services Standards				E 2011														
EN-1037: Ground Voice Network - NAS Voice Switch Level 2								E 2015										
R-0680: Applied Research on the Methodologies for Dynamically Allocating NAS Resources						R 2013												
R-0770: Applied Research on Dynamically Allocating National Airspace System (NAS) Demand						R 2013												
R-0780: Applied Research of Air Navigation Service Providers (ANSP) Roles and Responsibilities						R 2013												
R-1060: Applied Research on NextGen Team Size Optimization						R 2013												
D-0240: Facility and Networking Alternatives						D 2013												
D-1420: Business Continuity Requirements for Networked Facilities						D 2013												
D-1090: Dynamic Airspace Reconfiguration						D 2013												

EN-0301   Performance-Based Separation Standards and Procedures

Description: Performance-Based procedures and standards allow the Air Navigation Service Provider (ANSP) and Flight Operators to conduct reduced oceanic, en route, and terminal separation, such as: - 3-mile en route separation - alternatives evaluation and selection - 3-mile en route separation procedures - non-mosaic display - 5-mile non radar airspace separation procedures - Variable wake-based separation standards and procedures - Reduced oceanic separation standards and procedures The en route procedures provide accurate aircraft positional information to pilots and ground-based controllers enabling the reduction of separation to 3 miles, or 5-mile reduction which accommodates new larger aircraft and collision or wake turbulence encounter risk limits. Space-based data and voice communication provides direct controller-pilot communications enabling alternative trajectory operations.

SOPR: FAA	*Primary Supported OIs:* OI-0343
SOCR:	*Primary Supported Enablers:* EN-0033, EN-0035

Enabler Group: Separation Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-0301: Performance-Based Separation Standards and Procedures					E 2012													
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
D-0830: Trajectory Negotiation Protocols for Air and Ground Information Architectures			D 2010															
D-0480: Reduced Oceanic Separation Standards and Procedures			D 2010															
D-0490: 5nm Non-Radar Separation Standards and Procedures			D 2010															
D-0920: Traffic Spacing Management Components in Terminal and Transition Airspace			D 2010															
D-2127: 3D RNAV/RNP Procedures			D 2010															
D-1220: Development of Weather Hazard Severity Indices			D 2010															
PI-0110: International Commercial Space Operations				P 2011														

EN-1002   Non-Cooperative Surveillance - GSE

Description: Provides position reports on (and tracks the movement of) Ground Support Equipment (GSE) on the airport surface and perimeter through other than cooperative means. (This could include radar, video cameras, or other future technologies.) These position reports will be in an interoperable geospatial format. These non-cooperative position reports will become part of the integrated airport surface and perimeter surveillance system for that particular airport. The Net-Centric Infrastructure will provide the mechanism for conveyance, information assurance, access, and management.

SOPR: FAA	*Primary Supported OIs:* OI-4201, OI-4203, OI-4204
SOCR:	*Primary Supported Enablers:* EN-1003, EN-1049, EN-5004

Enabler Group: Non-Cooperative Surveillance Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1002: Non-Cooperative Surveillance - GSE				E 2011														
EN-1025: Airport Surface Surveillance - Legacy ASDE-X	E 2008																	
EN-1251: Information Sharing Standards: Flight and Surveillance Information			E 2010															
R-0990: Applied Research on Aircraft Support Systems		R 2009																
D-0970: Real-Time Airport Intruder Identification and Tracking System		D 2009																
PI-0009: National Integrated Surveillance Plan	P 2008																	
PI-0010: National Surveillance Strategy		P 2009																
PI-0012: Surveillance - Global Harmonization			P 2010															

EN-1003   Non-Cooperative Surveillance Information Service

Description: Provides the integrated non-cooperative position reports on (and tracks the movement of) aircraft, other aerial vehicles, and Ground Support Equipment (GSE) position. This service integrates surface and air surveillance assets along with weather phenomena within the airspace through other than cooperative means. (This could include radar or other future technologies.) These position reports will be in an interoperable geodetic format. These position reports form the integrated Non-Cooperative Surveillance Information Service, and based on access protocols are provided to aircraft operators, Air Navigation Service Provider (ANSP), Defense, and Security providers for integration into their visual display systems. Portions of the non-cooperative data may be made available to various users, depending on need and sensitivity of the information. The integrated surveillance data will be published for various users like aircraft operators, ANSP, airport operators, Airports Security operators, etc. over the Net-Centric Infrastructure (NCI). The NCI will provide the mechanism for conveyance, information assurance, access, and management.

SOPR: DOD   *Primary Supported OIs:* OI-4500, OI-4521, OI-4600
SOCR: *Primary Supported Enablers:* EN-1049

Enabler Group: Non-Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1003: Non-Cooperative Surveillance Information Service					E 2012													
EN-1017: Non-Cooperative Surveillance Legacy LRR	E 2008																	
EN-1020: Non-Cooperative Surveillance Legacy ASR-8	E 2008																	
EN-1021: Non-Cooperative Surveillance - Legacy ASR-9	E 2008																	
EN-1180: Ground Integrated Voice/Data Network - Level 1	E 2008																	
EN-1251: Information Sharing Standards: Flight and Surveillance Information			E 2010															
EN-1406: Airport Surveillance Video			E 2010															
EN-1002: Non-Cooperative Surveillance - GSE				E 2011														
EN-1237: NextGen Enterprise Network - DOD				E 2011														
D-2179: Enhanced Ground-Based Weather Sensors			D 2010															
PI-0009: National Integrated Surveillance Plan	P 2008																	
PI-0021: Protection of Data Shared Over-The-Air		P 2009																
PI-0012: Surveillance - Global Harmonization			P 2010															
PI-0098: Non-Cooperative Target Support			P 2010															

EN-1005   Cooperative Surveillance - Ground Equipment

Description: Provides self reporting (cooperative) position reports on (and track the movement of) Ground Support Equipment (GSE) on the airport surface. These position reports will be in an interoperable geodetic format. These cooperative position reports will become part of the integrated airport surveillance system for that particular airport. The Net-Centric Infrastructure (NCI) will provide the mechanism for conveyance, information assurance, access, and management.

SOPR: FAA   *Primary Supported OIs:*
SOCR: *Primary Supported Enablers:* EN-1506, EN-5004

Enabler Group: Cooperative Surveillance Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1005: Cooperative Surveillance - Ground Equipment					E 2012													
EN-1025: Airport Surface Surveillance - Legacy ASDE-X	E 2008																	
EN-1023: Cooperative Surveillance - ADS-B Out Level 1			E 2010															
EN-1251: Information Sharing Standards: Flight and Surveillance Information			E 2010															
R-0990: Applied Research on Aircraft Support Systems			R 2010															
D-0970: Real-Time Airport Intruder Identification and Tracking System			D 2010															
PI-0120: PNT Performance Requirements	P 2008																	

EN-1006   Integrated Cooperative Surveillance Information - Level 1

Description: Provides the integrated cooperative position reports produced by self reporting aircraft and ground based surveillance systems which provide multidimensional position reports. These position reports will be in an interoperable geodetic format. These position reports form the integrated Cooperative Surveillance Information Service, and based on access protocols are provided to aircraft operators, Air Navigation Service provider (ANSP), Defense and Security providers for integration into their visual display systems. The integrated surveillance data will be published for various users like aircraft operators, ANSP, airport operators, Airports Security operators, etc. over the Net-Centric Infrastructure (NCI). The Net-Centric Infrastructure will provide the mechanism for conveyance, information assurance, access, and management. The Level 1 Initial Operational Capabilities (IOC) provides integration of all legacy cooperative surveillance assets and Automatic Dependent Surveillance-Broadcast (ADS-B) Segment 1 services for user publication.

> *SOPR:* FAA   *Primary Supported OIs:* OI-0322
> *SOCR:*   *Primary Supported Enablers:* EN-0008, EN-0034, EN-0110, EN-1049, EN-1506

Enabler Group: Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1006: Integrated Cooperative Surveillance Information - Level 1					E 2012													
EN-1018: Cooperative Surveillance - Legacy Mode S.	E 2008																	
EN-1019: Cooperative Surveillance - Legacy ATCBI-6	E 2008																	
EN-1024: Cooperative Surveillance - PRM Level 1	E 2008																	
EN-1025: Airport Surface Surveillance - Legacy ASDE-X	E 2008																	
EN-1180: Ground Integrated Voice/Data Network - Level 1	E 2008																	
EN-1023: Cooperative Surveillance - ADS-B Out Level 1			E 2010															
EN-1251: Information Sharing Standards: Flight and Surveillance Information			E 2010															
EN-1400: Cooperative Surveillance - ADS-B IN/TIS-B/FIS-B Level 1			E 2010															
EN-1231: NextGen Enterprise Network - FAA				E 2011														
EN-1007: Avionics - Trajectory Management - Advanced Surface Operations					E 2012													
R-0270: Applied Research on a National Surveillance and Communications Needs Assessment			R 2010															
PI-0009: National Integrated Surveillance Plan	P 2008																	
PI-0120: PNT Performance Requirements	P 2008																	
PI-0010: National Surveillance Strategy		P 2009																
PI-0012: Surveillance - Global Harmonization			P 2010															

EN-1007   Avionics - Trajectory Management - Advanced Surface Operations

Description: A device/display that will assist aircraft in surface coordination and execution of surface management using precision navigation, cooperative surveillance, and onboard algorithms and displays that enable surface movement and guidance control.

> *SOPR:* Industry   *Primary Supported OIs:* OI-0327, OI-0400, OI-0401
> *SOCR:*   *Primary Supported Enablers:* EN-1006

Enabler Group: Avionics Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1007: Avionics - Trajectory Management - Advanced Surface Operations					E	2012												
EN-1045: Space Based Augmentation System - WAAS	E	2008																
D-2125: Situational Awareness Technologies in Low-Visibility and Surface Operations			D	2010														
D-1250: Safe Taxi Operations in Low Visibility Conditions			D	2010														
PI-0014: Aircraft Equipage Implementation Policy		P	2009															
PI-0022: GPS Policy to Support Civil NextGen PNT Requirements			P	2010														
PI-0115: NextGen Safety Assessment/Certification - Synchronization of Aircraft and ANS			P	2010														
PI-0116: NextGen Safety Assessment/Certification - Standards and Tools			P	2010														
PI-0117: NextGen Safety Assessment/Certification - Resources			P	2010														

EN-1010   Future Radio Spectrum

Description: Based on the research for radio spectrum needs and alternatives acquire, reassign, and/or allocate the necessary radio spectrum to provide the required bandwidth across ground, airborne, space, and mobile networking to allow "real-time" transmission rates for all data types, including simultaneous transmission of audio, graphics, and video. Appropriate Quality of Service (QoS); e.g. bandwidth, latency, availability) must be considered for each data type. Differing QoS levels may be appropriate, depending on whether the data is classified as safety-critical, advisory, etc. Consideration should be given to the evolution of a scalable Net-Centric Infrastructure (NCI) as technology advances.

 SOPR: FAA   *Primary Supported OIs:*

 SOCR: *Primary Supported Enablers:* EN-1061, EN-1202

Enabler Group: Radio-Based Communications Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1010: Future Radio Spectrum					E	2012												
R-0470: Applied Research on Radio Spectrum Needs and Alternatives			R	2010														
PI-0017: Communications Architecture Plan for Ground, Space, Airborne, and/or		P	2009															
PI-0073: Frequency/Spectrum - Global Harmonization					P	2012												

EN-1015   Enterprise Network Management Standards

Description: NextGen enterprise network management standards are authorized and published. All agency network management groups that participate in the NextGen information sharing environment must meet minimum standards. Network management is a continuous activity aimed at ensuring the successful operation of an enterprise network. A network management system typically consists of network managers assisted by automated tools running on and off the network. The International Organization of Standardization (ISO) Network Management Model establishes a framework for network management within and across network enclaves, business organizations, and integrated communities. The functional categories include Fault, Configuration, Administration, Performance, and Security (FCAPS) management. The goal of Fault Management is to recognize, isolate, correct and log faults that occur in the network. The goals of Configuration Management are to gather and store configurations from network devices (either locally or remotely), track changes which are made to the configuration, and to configure ('provision') circuits or paths through non-switched networks. The goals of Administration Management are to administer the set of authorized users by establishing users, passwords, and permissions, and to administer the operations of the equipment such as by performing software backup and synchronization. The goal of Performance Management (PM) is to enable the manager to prepare the network for the future and to determine the efficiency of the current network, using throughput, percentage utilization, error rates and response time's metrics to mange the network efficiency. The goal of Security Management is to control access to assets in the network, including such aspects as physical security of network equipment and boundary protection policies regarding firewalls, gateways, and other network connections. Network security policies must be continuously enforced. In addition to FCAPS, life-cycle management must be addressed for all network infrastructures (hardware, software, standards and protocols, etc.). Network designers and implementers must also factor into their plans the need for network expansion (new services, new users) and/or performance upgrades while maintaining continuous operations.

 SOPR: DOD   *Primary Supported OIs:*

 SOCR: *Primary Supported Enablers:* EN-1231, EN-1234, EN-1237, EN-1240, EN-4202

Enabler Group: Enterprise Networks and Standards Enablers

Enabler Listing																		

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1015: Enterprise Network Management Standards				E	2011													
EN-1230: Enterprise Networking Governance Structure			E	2010														
D-0260: Development of NextGen Interagency NCI Requirements		D	2009															
D-1070: Development of NextGen Interagency Net-Centric Security Requirements		D	2009															
PI-0024: Secure Information Exchange	P	2008																
PI-0108: Certifying Use of Net-Centric Information	P	2008																

EN-1016   Enterprise Networks Infrastructure Services Standards

Description: NextGen enterprise network infrastructure services standards and protocols are authorized and published. All agency enterprise networks that participate in the NextGen information sharing environment must meet minimum standards. In a service-oriented enterprise network, infrastructure services support the management and transport of data within and across network enclaves, business organizations, and integrated communities in a standardized and common manner. These infrastructure services include Registry/Discovery and Message Mediation. The goal of the Registry/Discovery Service is to provide the Enterprise Service locations and protocol bindings that are available. Standards related to Registry/Discovery should address the service registration process, guidelines for registry content, a framework for Service Level Agreements (SLAs), and metadata repositories related to service registry entries. On the same theme as Registry/Discovery, the standards should also address the use of lower-level network organization protocols such as DNS and LDAP. The goal of Message Mediation is to provide mechanisms to support service invocation styles (e.g., publish/subscribe, request/reply) and data exchange protocols. It enables message routing including the structures and metadata supporting intelligent (e.g., content-based) routing and policy. The mediation function must provide messaging Quality of Service (QoS) including priority and response time for each transaction. Infrastructure services standards should also describe the monitoring and reporting mechanisms necessary to continuously assess the health of infrastructure services and assure proper operation.

> *SOPR:* DOD   *Primary Supported OIs:*
> *SOCR:*   *Primary Supported Enablers:* EN-0300, EN-1231, EN-1234, EN-1237, EN-1240, EN-4202

Enabler Group: Enterprise Networks and Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1016: Enterprise Networks Infrastructure Services Standards				E	2011													
EN-1230: Enterprise Networking Governance Structure			E	2010														
R-1460: Applied Research on Common NextGen Automation Platform		R	2009															
D-0260: Development of NextGen Interagency NCI Requirements		D	2009															
D-1070: Development of NextGen Interagency Net-Centric Security Requirements		D	2009															
PI-0024: Secure Information Exchange	P	2008																
PI-0108: Certifying Use of Net-Centric Information	P	2008																

EN-1017   Non-Cooperative Surveillance Legacy LRR

Description: Long Range Radar (LRR) provides, via radar technology, aircraft and other aerial vehicle position and movement within the airspace through other than cooperative means. The LLR assets including the Air Route Surveillance Radar Models 1E, 2, 3, and 4 (ARSR-1E, ARSR-2, ARSR-3, ARSR-4), and Fixed Position Surveillance (FPS) radars have been transferred to the U.S. Department of Defense (DOD). Although the Federal Aviation Administration (FAA) will continue to maintain these radars, Department of Defense (DOD) and Department of Homeland Security (DHS) will share the cost of the effort.

> *SOPR:* DOD   *Primary Supported OIs:* OI-0355
> *SOCR:*   *Primary Supported Enablers:* EN-1003

Enabler Group: Non-Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1017: Non-Cooperative Surveillance Legacy LRR	E	2008																

Enabler Listing

EN-1018   Cooperative Surveillance - Legacy Mode S.

Description: The Mode Select (Mode S) mechanism is a ground-based system capable of selective interrogation of Mode S transponders and general interrogation of Air Traffic Control Radar Beacon System (ATCRBS) transponders within range. This cooperative system provides the Identification Friend Foe (IFF) in addition to aircraft position by replying to interrogation of its Mode S transponder. By 2014, the Federal Aviation Administration (FAA) has a decision milestone calling for en route and limited terminal replacement of legacy beacons (Mode S), and removal of remaining systems (Mode S, Air Traffic Control Beacon Indicator [ATCBI]-4/5). The current Federal Aviation Administration (FAA) Surveillance Roadmap calls for the beginning of decommission in 2018 with the end of service life expected to be 2020.

      SOPR: FAA   *Primary Supported OIs:*

      SOCR: *Primary Supported Enablers:* EN-1006

Enabler Group: Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1018: Cooperative Surveillance - Legacy Mode S.	E	2008																

EN-1019   Cooperative Surveillance - Legacy ATCBI-6

Description: The Air Traffic Control Beacon Interrogator Model 6 (ATCBI-6) is a ground-based system that interrogates aircraft-based Air Traffic Control Radar Beacon System (ATCRBS) transponders, receives, and processes their replies. This cooperative ground-based surveillance sensor system determines an aircraft's position, altitude, and Image File Format. By 2024, the Federal Aviation Administration (FAA) has a decision milestone for replacement of en route beacons (ATCBI-6).

      SOPR: FAA   *Primary Supported OIs:*

      SOCR: *Primary Supported Enablers:* EN-1006

Enabler Group: Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1019: Cooperative Surveillance - Legacy ATCBI-6	E	2008																

EN-1020   Non-Cooperative Surveillance Legacy ASR-8

Description: The Airport Surveillance Radar Model-8 (ASR-8) provides, via radar technology, aircraft, other aerial vehicle position and movement within the airspace through non-cooperative means. The ASR-8 primary radar is used in conjunction with the Air Traffic Control Beacon Indicator (ATCBI)-4/5, or Mode Select Beacon System (Mode-S) cooperative ground-based surveillance system for aircraft identification. By 2014, the Federal Aviation Administration (FAA) has a decision milestone for replacement of legacy ASR-8 primary radar based on air traffic safety and weather surveillance requirements. Given that the FAA will transition to an Automatic Dependent Surveillance-Broadcast (ADS-B) based surveillance system starting in 2009, this will influence the decision how the FAA should sustain the legacy Terminal radar capability during the transition.

      SOPR: FAA   *Primary Supported OIs:* OI-0311, OI-0318, OI-0319

      SOCR: *Primary Supported Enablers:* EN-1003

Enabler Group: Non-Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1020: Non-Cooperative Surveillance Legacy ASR-8	E	2008																

Enabler Listing

EN-1021   Non-Cooperative Surveillance - Legacy ASR-9

Description: The Airport Surveillance Radar Model-9 (ASR-9) provides, via radar technology, aircraft, other aerial vehicle position and movement within the airspace through non-cooperative means. The ASR-9 has a separate weather channel with associated processing capable of providing six-level weather contours. The six-level weather channel is primarily used to supplement Next Generation Weather Radar (NEXRAD) coverage. The ASR-9 primary radar is used in conjunction with the Mode Select Beacon System (Mode-S), or the Air Traffic Control Beacon Indicator (ATCBI)-4/5 cooperative ground-based surveillance system for aircraft identification. By 2014, the Federal Aviation Administration (FAA) has a decision milestone for replacement of legacy ASR-9 primary radar, based on air traffic safety and weather surveillance requirements. The ASR-9 will be upgraded/replaced with the ASR-9/Mode S Service Life Extension Program (SLEP) in the 2007-12 timeframe.

SOPR: FAA	*Primary Supported OIs:* OI-0311, OI-0318, OI-0319
SOCR:	*Primary Supported Enablers:* EN-1003

Enabler Group: Non-Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1021: Non-Cooperative Surveillance - Legacy ASR-9	E 2008																	

EN-1022   Air Surveillance - Legacy ASR-11

Description: The Airport Surveillance Radar Model-11 (ASR-11) provides, via radar technology, aircraft and other aerial vehicle position and movement within the airspace through both cooperative and non-cooperative means (Identification Friend Foe [IFF] and Radar). The Federal Aviation Administration (FAA) currently has no extension plan for the ASR-11 program to replace remaining ASR-8/ Air Traffic Control Beacon Indicators (ATCBIs). The Legacy systems can be sustained through 2020 with low activity refresh.

SOPR: FAA	*Primary Supported OIs:* OI-0311, OI-0318, OI-0319
SOCR:	*Primary Supported Enablers:*

Enabler Group: Integrated Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1022: Air Surveillance - Legacy ASR-11	E 2008																	
PI-0120: PNT Performance Requirements	P 2008																	

EN-1023   Cooperative Surveillance - ADS-B Out Level 1

Description: The Automatic Dependent Surveillance-Broadcast (ADS-B) cooperative system provides surveillance and situational awareness simultaneously to pilots and Air Traffic Control (ATC) facilities. This Global Position System (GPS)-based system enables aircraft equipment to determine an aircraft's multidimensional position within airspace or on the surface of an airport. This data is then transmitted by the aircraft to other similarly equipped aircraft and ground based Surveillance sensor systems. The Federal Aviation Administration (FAA) plans to deploy the ADS-B capabilities in 4 Segments the following are the activities for this segment: Segment 1 (2007 - 2010): - Begin Avionics Equipage: FY 2007 - Expand traffic Information Service-Broadcast (TIS-B)/Flight Information Service-Broadcast (FIS-B) Infrastructure: FY 2007 - FY 2010 - Additional Aircraft to Aircraft Requirements Definition: FY 2007 - FY 2010 -ADS-B "Out" Notice of Proposed Rulemaking (NPRM) Issued: FY 2008 - Begin Initial Aircraft to Aircraft Application Deployment: FY 2008 - Targeted ADS-B Infrastructure Deployment: FY 2010.

SOPR: FAA	*Primary Supported OIs:* OI-0310, OI-0343, OI-0347, OI-0355, OI-0362
SOCR:	*Primary Supported Enablers:* EN-1005, EN-1006, EN-1400, EN-1500, EN-1504

Enabler Group: Cooperative Surveillance Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1023: Cooperative Surveillance - ADS-B Out Level 1			E 2010															
EN-1045: Space Based Augmentation System - WAAS	E 2008																	
EN-1060: Radio Data Link - Legacy 1090/1030	E 2008																	
EN-1160: Space Based Navigation System - GPS Legacy	E 2008																	
EN-1190: Radio Data Link - Legacy General Aviation UAT	E 2008																	
PI-0009: National Integrated Surveillance Plan	P 2008																	
PI-0120: PNT Performance Requirements	P 2008																	
PI-0010: National Surveillance Strategy		P 2009																	
PI-0014: Aircraft Equipage Implementation Policy		P 2009																	
PI-0021: Protection of Data Shared Over-The-Air		P 2009																	
PI-0012: Surveillance - Global Harmonization			P 2010															
PI-0022: GPS Policy to Support Civil NextGen PNT Requirements			P 2010															
PI-0115: NextGen Safety Assessment/Certification - Synchronization of Aircraft and ANS			P 2010															
PI-0116: NextGen Safety Assessment/Certification - Standards and Tools			P 2010															
PI-0117: NextGen Safety Assessment/Certification - Resources			P 2010															

EN-1024   Cooperative Surveillance - PRM Level 1

Description: The Precision Runway Monitor (PRM) system is a highly accurate cooperative electronic scan radar that tracks and processes aircraft targets at a 1-second update rate. The PRM system provides controllers with automatic alerts and high-resolution displays that, in conjunction with specific procedures, enable pilots to fly simultaneous independent approaches to parallel runways spaced less than 4,300 feet apart. Without PRM parallel runways can be used for simultaneous independent approaches only during Visual Meteorological Conditions. With PRM, simultaneous independent approaches can be made to closely-spaced parallel runways under Instrument Meteorological Conditions (IMC). The inability of pilots to conduct such approaches during adverse weather reduces throughput and increases delays.

> *SOPR:* FAA　　　　　　　*Primary Supported OIs:*
> *SOCR:*　　　　　　　　*Primary Supported Enablers:* EN-1006, EN-1404

Enabler Group: Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1024: Cooperative Surveillance - PRM Level 1	E 2008																	

EN-1025   Airport Surface Surveillance - Legacy ASDE-X

Description: The Airport Surface Detection Equipment Model - 3/X (ASDE-3/X) provides integrated airport surface surveillance - via plot level fusion of radar technology, multilateration, Automatic Dependent Surveillance-Broadcast (ADS-B), & aircraft equipment. Fused track plot data is then placed on Air Navigation Service Provider (ANSP) tower display. This is a closed non-network system. Provides aircraft and other ground vehicle positions and movement on the surface of the airport.

> *SOPR:* FAA　　　　　　　*Primary Supported OIs:*
> *SOCR:*　　　　　　　　*Primary Supported Enablers:* EN-1002, EN-1005, EN-1006, EN-1271, EN-5004

Enabler Group: Integrated Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1025: Airport Surface Surveillance - Legacy ASDE-X	E 2008																	
PI-0120: PNT Performance Requirements	P 2008																	

Enabler Listing

EN-1032   Radio-Based Voice Network - Legacy VHF/UHF

Description: The Very High Frequency (VHF) ground-based and Airborne radios support tactical Air Traffic Control (ATC) which provide voice communications, and enables coordination between the ground-based controller and the pilot in commercial, cargo, or general aviation aircraft in the Oceanic, En route, Terminal, and Flight Service Station domains. Additionally, there are devices used by flight inspection, aviation security, and airway facilities specialists supporting local airport operations and maintenance or to perform their operational maintenance mission in support of the national airspace system (NAS). Furthermore, these same devices are also used to support the resolution of emergency situations or establish a level of voice command and control communications/coordination during disaster recovery.

SOPR: FAA   *Primary Supported OIs:* OI-0318
SOCR: *Primary Supported Enablers:* EN-0008, EN-0110

Enabler Group: Radio-Based Communications Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1032: Radio-Based Voice Network - Legacy VHF/UHF	E 2008																	

EN-1033   Fixed Radio - Data Communications Level 1

Description: Ground-based VHF Digital Link - Mode 2 (VDL-2) radio is fielded for operational use. VDL-2 is a data communications technology designed to support safety-critical air traffic control applications. It replaces the aging ACARS technology and represents the latest generation of Air traffic Control (ATC) data communication. Subject to bandwidth limitations, VDL-2 can provide a link for many types of air-ground data exchanges (e.g. controller-pilot messages, trajectories, flight information, etc.).

SOPR: FAA   *Primary Supported OIs:* OI-0369
SOCR: *Primary Supported Enablers:* EN-1203, EN-1204, EN-1205, EN-1206, EN-1207, EN-1208, EN-1209, EN-1210, EN-1211, EN-1212, EN-1213, EN-1214, EN-1215, EN-1216, EN-1217, EN-1219, EN-1220, EN-1221, EN-1223, EN-1224, EN-1225

Enabler Group: Radio-Based Communications Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															

EN-1035   Ground Voice Network- (Legacy Voice Communications)

Description: Legacy Voice Communications is provided by the Voice Switching And Control System (VSCS), the Air Traffic Control Tower (ATCT) Enhance Terminal Voice Switch (ETVS) and other switches in the National Airspace System (NAS) inventory across the Air Traffic flight domains (En Route, Terminal Radar Approach Control [TRACON], and Tower). These legacy voice switches provide ground-to-ground voice communications both interfacility and intrafacility along with remote control access to air-to-ground radio equipment for controller-to-pilot communications. The NAS Voice Switch (NVS) program is planned to provide the replacement of the aging technology. The decision to proceed is dependent on the Final Investment Decision (FID) by 2010.

SOPR: FAA   *Primary Supported OIs:*
SOCR: *Primary Supported Enablers:* EN-1036

Enabler Group: Aviation Voice and Data Network Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1035: Ground Voice Network- (Legacy Voice Communications)	E 2008																	

Enabler Listing

EN-1036   Ground Voice Network - NAS Voice Switch Level 1

Description: The National Airspace System (NAS) Voice Switch (NVS) is a program to replace 20+ year old NAS voice switches with a new technology switching system capable of meeting NextGen requirements (i.e. configurable, reliable links between controllers and pilots). Level 1 consists of a deployment of NVS equipment to the terminal domain and provides a continuation of legacy communications capabilities.

SOPR: FAA	*Primary Supported OIs:* OI-0351
SOCR:	*Primary Supported Enablers:* EN-1037

Enabler Group: Aviation Voice and Data Network Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1036: Ground Voice Network - NAS Voice Switch Level 1					E 2012													
EN-1035: Ground Voice Network- (Legacy Voice Communications)	E 2008																	

EN-1037   Ground Voice Network - NAS Voice Switch Level 2

Description: Level 2 of the National Airspace System (NAS) Voice Switch (NVS) introduces NVS equipment into the en route domain. Two key sites will be selected. Level 2 will be achieved as of the in service decision for these key sites. During the period of time following that decision, NVS will be deployed to Air Route Traffic Control Center (ARTCCs) and Terminal Radar Approach Control (TRACONs) providing limited networking capability. The switches will be "network capable", awaiting full deployment of the network and other enablers to fully meet NextGen requirements.

SOPR: FAA	*Primary Supported OIs:* OI-0307
SOCR:	*Primary Supported Enablers:* EN-0300, EN-1048

Enabler Group: Aviation Voice and Data Network Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1037: Ground Voice Network - NAS Voice Switch Level 2								E 2015										
EN-1036: Ground Voice Network - NAS Voice Switch Level 1					E 2012													
PI-0017: Communications Architecture Plan for Ground, Space, Airborne, and/or	P 2009																	

EN-1039   GBNS - DME Legacy

Description: The Distance Measuring Equipment (DME) is an Ultra High Frequency (UHF) Ground-Based Navigation System (GBNS) that responds to aircraft DME avionics interrogations, thereby enabling the avionics to determine the slant range between the aircraft and the ground station. DMEs will be sustained to support en route area navigation (RNAV), and category (CAT) II/III Instrument Landing System (ILS). DMEs may be expanded to support airspace design and provide a redundant ground-based capability to supplement global positioning system (GPS) procedures.

SOPR: FAA	*Primary Supported OIs:* OI-0350
SOCR:	*Primary Supported Enablers:* EN-5047

Enabler Group: Ground-Based Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1039: GBNS - DME Legacy	E 2008																	

Enabler Listing

EN-1040   Space Based Navigation System - Galileo

Description: The European Union plans to offer Galileo GNSS with five worldwide service levels, including open access and restricted access for various segments of users. These services are: (1) Open Service, supplied free of charge to the general public; (2) Commercial Service, "for-fee" service for professional, high-precision applications; (3) Safety of Life Service, providing enhanced accuracy and integrity for safety-critical applications such as aircraft approach and landing; (4) Search and Rescue (SAR) service, with relay of distress alarms and compatible with COSPAS-SARSAT; and (5) Public Regulated Service (PRS), an encrypted signal for military and para-military users. These services are mostly compatible with existing Global Positioning System (GPS) services; broadcast a precisely timed L-band signal that is received and processed onboard aircraft, in ground vehicles or hand-held receivers to determine the users three-dimensional position (i.e., latitude, longitude and altitude), velocity (if applicable) and the precise time of day.

   SOPR: EUROCONTROL   *Primary Supported OIs:*

   SOCR: *Primary Supported Enablers:* EN-1101

Enabler Group: Space-Based Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1040: Space Based Navigation System - Galileo								E 2015										
D-1820: Foreign GNSS Usage Strategy						D 2013												
D-1710: Risk Reducing Interfaces, Procedures, and Training						D 2013												
PI-0120: PNT Performance Requirements	P 2008																	
PI-0075: PNT Services - Global Harmonization						P 2013												

EN-1041   Space Based Navigation System - GPS Aviation Dual Frequency

Description: One of the features of the Ground Positioning System (GPS) Block IIF, and follow on GPS Block III modernization programs is the addition of the L5 Signal, located in the Aeronautical Radio Navigation Service (ARNS) band at 1176.45 MHz. This new L5 signal is protected worldwide for ARNS use, and will support aviation safety-of-life applications. The addition of L5 will make GPS a more robust radio navigation service for all users who choose to upgrade to multi-frequency receivers. This includes aviation applications, as well as all ground-based users (maritime, railways, surface, shipping, agriculture, recreation, etc.) GPS Block IIF launches commence in 2009, followed by GPS Block III launches in the 2013 timeframe. With current GPS satellite replenishment rates, L5 will be available for initial operational capability (IOC) by 2015, and will achieve full operational capability by approximately 2018. Benefits include improved interference mitigation and increased availability of Performance-based operations.

   SOPR: DOD   *Primary Supported OIs:* OI-0317, OI-0334, OI-0381

   SOCR: *Primary Supported Enablers:* EN-1042

Enabler Group: Space-Based Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1041: Space Based Navigation System - GPS Aviation Dual Frequency						E 2013												
EN-1160: Space Based Navigation System - GPS Legacy	E 2008																	
D-0330: Aircraft-Based Precision Approach Capability				D 2011														
PI-0120: PNT Performance Requirements	P 2008																	
PI-0075: PNT Services - Global Harmonization						P 2013												

Enabler Listing

EN-1042   Space Based Navigation System - GPS Enhanced Accuracy/Integrity Monitoring

Description: The GPS Block III program objective is to develop and deploy a redesigned Global Positioning System (GPS), within the constrains of frequency allocations, backward compatibility, and the recent agreements with the European Union, in order to take advantage of the newer technologies and exploit the present GPS infrastructure, to meet the new military and civilian needs and expectations economically. GPS Block III objectives include: sub-meter positioning accuracy, and 1-2 ns timing accuracy; higher integrity, including assured accuracy during normal system degradation or planned attack, high degree of self monitoring within a satellite or across a constellation, more secure ground-to-space and space-to-space links, improved civil signal monitoring, higher availability and continuity; support for specific military missions, and high power M-code signals broadcast with directional spot beams; and support for specific civil missions, such as aviation Category (CAT) I, with integrity. GPS Block III will also include space weather mitigation capabilities.

  SOPR: DOD   *Primary Supported OIs:*

  SOCR: *Primary Supported Enablers:* EN-1101

Enabler Group: Space-Based Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1042: Space Based Navigation System - GPS Enhanced Accuracy/Integrity Monitoring													E 2020					
EN-1041: Space Based Navigation System - GPS Aviation Dual Frequency						E 2013												
PI-0120: PNT Performance Requirements	P 2008																	
PI-0075: PNT Services - Global Harmonization						P 2013												

EN-1043   Enterprise Networks Security Services Standards

Description: NextGen enterprise network security services standards and protocols are authorized and published. All agency enterprise networks that participate in the NextGen information sharing environment must meet minimum standards. The goal of security services is to enforce security policies at the service and message level including providing authorization-based access to data and services (identity and role-based access control). Security services allow users to access the information they need, while securing classified/sensitive data from access by unauthorized persons and protecting networks from intended/unintended corruption by 'malicious' or hidden code. Security services ensure both publishers and subscribers can verify identities, authenticate themselves, and assert access privileges. Identification and authentication can be accomplished using services such as Public Key Infrastructure (PKI) services. Leveraging encryption, security services also ensure confidentiality and information integrity by guarding against unauthorized modification of data and services. Security services standards should also describe the monitoring and reporting mechanisms necessary to continuously assess the health of security services and assure proper operation.

  SOPR: DOD   *Primary Supported OIs:*

  SOCR: *Primary Supported Enablers:* EN-0300, EN-1231, EN-1234, EN-1237, EN-1240, EN-4202

Enabler Group: Enterprise Networks and Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1043: Enterprise Networks Security Services Standards				E 2011														
EN-1230: Enterprise Networking Governance Structure			E 2010															
D-1070: Development of NextGen Interagency Net-Centric Security Requirements		D 2009																
PI-0024: Secure Information Exchange	P 2008																	
PI-0108: Certifying Use of Net-Centric Information	P 2008																	

Enabler Listing

EN-1044   Space Based Navigation System - International GNSS

Description: Many countries have heavily funded the development of global navigation satellite systems (GNSS) for worldwide use, and augmentation systems for regional use. The Russian Federation has recently initiated a modernization of the Soviet Global Navigation Satellite System (GLONASS), and the Peoples Republic of China has begun research and deployment of the Compass (formerly Beidou) System. The Republic of India has begun development of a regional augmentation system for use with the global positioning system (GPS), which they refer to as the GPS Aided Geo Augmented Navigation (GAGAN). Japan has also developed a regional GPS augmentation system referred to as the Multi-functional Satellite Augmentation System (MSAS), and the European Union has developed the European Geostationary Navigation Overlay Service (EGNOS) augmentation system, intended for use with the Galileo, GLONASS and GPS GNSS Systems. Systems availabilities are expected to vary, however, Initial Availability is based on anticipation of a future US policy decision.

SOPR: DOS	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-1101

Enabler Group: Space-Based Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1044: Space Based Navigation System - International GNSS											E	2018						
D-1820: Foreign GNSS Usage Strategy									D	2016								
PI-0120: PNT Performance Requirements	P	2008																
PI-0075: PNT Services - Global Harmonization						P	2013											

EN-1045   Space Based Augmentation System - WAAS

Description: The Wide Area Augmentation System (WAAS) consists of a network of GPS monitoring sites, processing facilities, and satellite earth stations, that provide correction and integrity messages to geostationary satellites, which broadcast this information to single frequency (L1-C/A) user avionics. The user avionics applies these corrections to accurately determine an aircraft's 3-dimensional (3D) position in space. The WAAS messages enable an accuracy that supports all area navigation (RNAV) and required navigation performance (RNP) operations, localizer performance/vertical guidance (LPV) approach operations equivalent to instrument landing system (ILS) down to 200 feet above the landing surface, and positioning for automated dependent surveillance-broadcast (ADS-B) operations. WAAS provides service to all of the contiguous United States, Hawaii, most of Alaska, the Caribbean, and significant portions of Canada and Mexico. Modernization of GPS by the US Department of Defense (DOD) will provide a second civil frequency (L5), protected for aviation starting with the GPS IIF, with initial launch planned for 2008, and continuing with GPS III, with initial launch in the 2013 timeframe. WAAS services can be expected to improve with the addition of L5 corrections.

SOPR: FAA	*Primary Supported OIs:* OI-0334
SOCR:	*Primary Supported Enablers:* EN-1007, EN-1023, EN-1190, EN-5047

Enabler Group: Space-Based Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1045: Space Based Augmentation System - WAAS	E	2008																
EN-1160: Space Based Navigation System - GPS Legacy	E	2008																

EN-1048   Ground Voice Network - NAS Voice Switch Level 3

Description: Full implementation of the National Airspace System (NAS) Voice Switch (NVS) throughout the NAS, including en route, terminal, and ground environments. NVS Level 3 provides a network-addressable switching solution which enables air traffic managers to redistribute communications assets among facilities in a more dynamic and cost effective manner while assuring critical voice switching services.

SOPR: FAA	*Primary Supported OIs:* OI-0339
SOCR:	*Primary Supported Enablers:*

Enabler Group: Aviation Voice and Data Network Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1048: Ground Voice Network - NAS Voice Switch Level 3											E	2018						
EN-1037: Ground Voice Network - NAS Voice Switch Level 2								E	2015									

Enabler Listing

EN-1049   Integrated Surveillance Information Service Level 1

Description: This Enterprise Service provides the fused position reports on (and tracks the movement of) aircraft, other aerial vehicles, and Ground Support Equipment (GSE) by integrating the Cooperative and Non-cooperative surveillance systems. These position reports will be in an interoperable geospatial format and time tagged. These position reports will enable various users like aircraft operators, Air Navigation Service Providers (ANSP), airport operators, Defense and Security providers, etc to produce an integrated air surveillance picture for their specific mission needs. Additionally these position reports could be used with developed flight algorithms to predict possible safety incursions. By linking these reports with other flight plan data, the resulting Flight Object will enable performance-based services and data sharing between aircraft operators, ANSPs, Flight Operations Centers to enable Collaborative Decision-Making (CDM) where applicable. The preferred source of the position reports is the Cooperative self-reporting air and ground vehicles. If and when the Cooperative surveillance dissemination fails, the Non-cooperative surveillance information is used when available. The Integrated Surveillance Information Service provides the precise positional information required for trajectory-based operations (TBO) envisioned within NextGen. This is accomplished by providing accurate Position (Latitude, Longitude, and Altitude), Timing (Direction & Speed), and Intent (Anticipated changes in direction & speed). In addition, provide surveillance information tagged with quality attributes; Accuracy, Age (timeliness), Reliability, and Sensor source and accuracy information available based on eligibility. Furthermore, the service provides the ability to produce a timely on-demand air-picture appropriate to needs of user and system. The Level 1 Initial Operational Capabilities (IOC) provides the initial deployment necessary to support Level 1 services. These services include the Legacy Cooperative and Non-Cooperative Ground and Air Surveillance Systems, ASDE-X, and Automatic Dependent Surveillance-Broadcast (ADS-B) Segment 1.

> *SOPR:* DOD-FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-1510

Enabler Group: Integrated Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1049: Integrated Surveillance Information Service Level 1					E 2012													
EN-1180: Ground Integrated Voice/Data Network - Level 1	E 2008																	
EN-1002: Non-Cooperative Surveillance - GSE				E 2011														
EN-1231: NextGen Enterprise Network - FAA				E 2011														
EN-1003: Non-Cooperative Surveillance Information Service					E 2012													
EN-1006: Integrated Cooperative Surveillance Information - Level 1					E 2012													
D-2143: National Surveillance Architecture			D 2010															
PI-0009: National Integrated Surveillance Plan	P 2008																	
PI-0012: Surveillance - Global Harmonization			P 2010															

EN-1060   Radio Data Link - Legacy 1090/1030

Description: The 1090/1030 data link has been, for decades, the primary data enabler for secondary surveillance. This data link combines the 1090/1030 spectrum, Mode 3 and Mode S protocols (among other less common protocols), and associated equipment. Compatible equipment, to varying levels of capabilities, are installed in virtually all aircraft and ground systems in the National Airspace System (NAS). The 1090/1030 data link is an enabler for secondary surveillance and dependent surveillance of commercial aircraft (i.e. Automatic Dependent Surveillance-Broadcast [ADS-B]), and may be useful for other future purposes.

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-1023

Enabler Group: Radio-Based Communications Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1060: Radio Data Link - Legacy 1090/1030	E 2008																	
PI-0120: PNT Performance Requirements	P 2008																	

Enabler Listing

EN-1061   Fixed Radio - Data Communications Level 2

Description: Next generation of ground-based radios that support advanced and safety-critical data communications. This represents the next generation of data communications and is expected to offer higher bandwidth operation worldwide. The new radios will incorporate space weather mitigation capabilities. In order to achieve this higher bandwidth, spectrum reassignment or new spectrum allocation may be required. This may include new integration capabilities such as voice/data integration and ground/air network integration. There also may be new data exchanges such as high-resolution weather data. Details will emerge as research is completed and key decisions are made.

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-1170

Enabler Group: Radio-Based Communications Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1061: Fixed Radio - Data Communications Level 2															E	**2022**		
EN-1010: Future Radio Spectrum					E	**2012**												
PI-0017: Communications Architecture Plan for Ground, Space, Airborne, and/or	P	**2009**																

EN-1062   Mobile Data Communications Management Applications - Level 1

Description: The mobile data communications management applications to support the following types of data exchanges between ground and mobile platforms: Data Link Logon, Air Traffic Control (ATC) Communications Management, ATC Clearances, Departure Clearances, Data Link Taxi (Departure), Free Text Messages, Data Link Automatic Terminal Information Service, and Arrival Manager Information Delivery Service. Level 1 mobile data communications applications have limited or no integration with flight management systems.

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-1063, EN-1203, EN-1204, EN-1206, EN-1209, EN-1215, EN-1216, EN-1220

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1062: Mobile Data Communications Management Applications - Level 1					E	**2012**												

EN-1063   Mobile Data Communications Management Applications - Level 2

Description: The mobile data communications management applications to support the following types of data exchanges between ground and mobile platforms: Data Link Taxi (Arrival), Trajectory coordination for initial four-dimensional (4D) trajectories in mixed airspace and performance based airspace, Downstream Clearances, Data Link Flight Update, and Flight Path Intent Service. Level 2 mobile data communications applications enable advanced integration with flight management systems to reduce pilot workload, improve safety, and increase National Airspace System (NAS) capacity.

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-1064, EN-1205, EN-1207, EN-1210, EN-1212, EN-1213, EN-1217, EN-1219, EN-1221, EN-1223, EN-1224, EN-2020

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1063: Mobile Data Communications Management Applications - Level 2										E	**2017**							
EN-1062: Mobile Data Communications Management Applications - Level 1					E	**2012**												
D-2129: Required Aircraft 4DT Intent Data								D	**2015**									

Enabler Listing

EN-1064   Mobile Data Communications Management Applications - Level 3

Description: The mobile data communications management applications to support the following types of data exchanges between ground and mobile platforms: Trajectory coordination for widespread use of four-dimensional (4D) trajectory agreements down to paired approach, and delegated separation maneuvers consisting of In-Trail Procedures, Merging & Spacing, and Crossing & Passing. Level 3 mobile data communications management applications are an integral element of the next generation avionics architectures, and are fully integrated with flight management and delegated/self-separation supporting systems.

SOPR: FAA	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-1208, EN-1211, EN-1214, EN-1225

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1064: Mobile Data Communications Management Applications - Level 3															E **2022**			
EN-1063: Mobile Data Communications Management Applications - Level 2									E **2017**									
D-2129: Required Aircraft 4DT Intent Data													D **2020**					

EN-1065   Ground Based Navigation System (GBNS) - Lighting Systems (Legacy)

Description: Approach lighting systems are ground based systems that provide visual guidance to an aircraft approaching the runway environment. Used in conjunction with ground- or space-based navigation systems, they enable a flight crew to acquire the runway environment in Instrument Meteorological Conditions (IMC), in order to conduct a safe landing. Approach Lighting Systems refers to the use of acceptable variations of lighting systems, such as Medium-intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR), High-intensity Approach Lighting System with Sequenced Flashing Lights (ALSF-1, -2), and Runway End Identifier Lights (REIL); and are required for the conduct of a precision approach.

SOPR: FAA	*Primary Supported OIs:* OI-0316, OI-0334, OI-0381
SOCR:	*Primary Supported Enablers:*

Enabler Group: Ground-Based Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1065: Ground Based Navigation System (GBNS) - Lighting Systems (Legacy)	E **2008**																	

EN-1066   Ground Based Navigation System (GBNS) - NextGen Lighting Systems

Description: NextGen lighting systems anticipated to replace the legacy incandescent Approach Lighting System (ALS) of today, such as Medium-intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR), High-intensity Approach Lighting System with Sequenced Flashing Lights (ALSF-1, -2), and Runway End Identifier Lights (REIL). Compared to legacy lighting systems, NextGen Lighting Systems are expected to consume significantly less energy and reduce costs necessary to implement and maintain.

SOPR: FAA	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-6043

Enabler Group: Ground-Based Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1066: Ground Based Navigation System (GBNS) - NextGen Lighting Systems											E **2018**							
D-2121: NextGen ALS									D **2016**									

EN-1101   Enhanced NextGen PNT Services

Description: Using the guidance provided from the national Positioning, Navigation, and Timing (PNT) Architecture strategy, PNT services systems will be enhanced and/or augmented as appropriate to meet NextGen needs for increased accuracy, availability, continuity, integrity, and redundancy.

SOPR: National Space-Based PNT ExComm	*Primary Supported OIs:* OI-0348
SOCR:	*Primary Supported Enablers:*

Enabler Group: Space-Based Systems Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1101: Enhanced NextGen PNT Services																	**2025**	**E**
EN-1040: Space Based Navigation System - Galileo								E	**2015**									
EN-1044: Space Based Navigation System - International GNSS										E	**2018**							
EN-1042: Space Based Navigation System - GPS Enhanced Accuracy/Integrity Monitoring												E	**2020**					
D-1830: National PNT Architecture Strategy																D	**2023**	
D-0250: PNT Complementary and Backup System Strategy																D	**2023**	
D-1550: Augmentation Strategy for GNSS																D	**2023**	
PI-0120: PNT Performance Requirements	P	**2008**																

EN-1120   GBAS - Local Area Augmentation System (LAAS)

Description: Global Positioning System (GPS) III is expected to eventually meet aviation integrity and performance requirements for the majority of navigation capabilities. Ground-Based Augmentation Systems (GBAS), however, are expected to be needed to meet the most stringent operational signal requirements for approach, landing, and surface movement, in the low to zero visibility conditions of category (CAT) III operations. GBAS will provide local area corrections to GPS signals, GPS integrity monitoring, and flight path information, to aircraft in the terminal area, for high accuracy operations. Initial implementation and operational approval of International Civil Aviation Organization (ICAO) GBAS for CAT-I equivalent operations will be complete in 2008. Research & development will then continue in order to demonstrate a CAT-III equivalent capability by 2010. GBAS capable of CAT-III equivalent operations are expected to be fully approved by 2012, initially available in 2017 and fully available at qualifying airports by 2025.

SOPR: FAA	*Primary Supported OIs:* OI-0317, OI-0322, OI-0334, OI-0340, OI-0341, OI-0381
SOCR:	*Primary Supported Enablers:* EN-5047

Enabler Group: Space-Based Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1120: GBAS - Local Area Augmentation System (LAAS)										E	**2017**							
PI-0120: PNT Performance Requirements	P	**2008**																

EN-1143   Ground Based Navigation System (GBNS) - eLORAN

Description: The Enhanced Long-Range Navigation (eLORAN) system is an independent, dissimilar, complement to Global Navigation Satellite Systems (GNSS). US modernization of the LORAN-C program resulted in eLORAN, providing significantly improved performance. It has much better accuracy, integrity and continuity, while continuing to meet Loran-C's traditional availability requirements, achieved through the addition of a data channel to distribute corrections, allowing eLORAN to meet the very demanding requirements of aviation non-precision instrument approaches. eLORAN has also shown to be capable of providing the exceedingly precise time and frequency references needed by telecommunications systems that carry voice and internet communications. As eLORAN uses high-powered transmitters and low-frequency signals (not microwatts and microwaves like GNSS), it is very unlikely to be disrupted or jammed by the same causes that would disrupt GNSS signals. This means that small, low-cost, eLORAN receivers, even built into GNSS units, can mitigate the impact of disruptions to GNSS. Moreover, eLORAN can do things GNSS cannot, such as acting as a static compass.

SOPR: DHS	*Primary Supported OIs:* OI-0307, OI-0333
SOCR:	*Primary Supported Enablers:*

Enabler Group: Ground-Based Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1143: Ground Based Navigation System (GBNS) - eLORAN								E	**2015**									
PI-0120: PNT Performance Requirements	P	**2008**																

Enabler Listing

EN-1144   Ground Based Navigation System (GBNS) - ILS Legacy

Description: The Instrument Landing System (ILS) is a ground-based instrument approach system which provides precise guidance to an aircraft approaching a runway, using a combination of radio signals and, in many cases, high-intensity lighting arrays to enable a safe landing during Instrument Meteorological Conditions (IMC), such as low ceilings or reduced visibility due to fog, rain, or blowing snow. In the NextGen timeframe, the ILS will serve as a backup, providing a precision approach capability in the event of a Global Navigation System Satellite (GNSS) outage.

SOPR: FAA   *Primary Supported OIs:* OI-0311

SOCR: *Primary Supported Enablers:*

Enabler Group: Ground-Based Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1144: Ground Based Navigation System (GBNS) - ILS Legacy	E 2008																	
PI-0120: PNT Performance Requirements	P 2008																	

EN-1160   Space Based Navigation System - GPS Legacy

Description: The United States Global Positioning System (GPS) is a constellation of satellites orbiting at approximately 12,000 miles above the earth in six equally spaced planes. The GPS satellites broadcast a precisely timed L-band signal that is received and processed onboard aircraft, ground vehicles, or hand-held receivers to determine the users three-dimensional position (i.e., latitude, longitude and altitude), velocity (if applicable) and the precise time of day. The GPS was developed, and is currently maintained and operated by the US Department of Defense (DoD). It currently provides multiple ranging signals on both the L1 and L2 bands. L1-C/A is contained within the protected Aeronautical Radio Navigation Service (ARNS) Band.

SOPR: DOD   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-0102, EN-0201, EN-1023, EN-1041, EN-1045, EN-1190

Enabler Group: Space-Based Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1160: Space Based Navigation System - GPS Legacy	E 2008																	

EN-1170   Integrated Ground and Air Network for Voice/Data

Description: This network will interconnect and integrate ground/ground, air/ground, and air/air communications for voice and data. It will allow for seamless voice and data access between facilities, air traffic managers, aircraft, and pilots. This includes integration of fixed radio, satellite, and ground communications. This network may support functions beyond traditional Air Traffic Management (ATM), for example, facilitating the exchange of additional safety, security, or operational information. The Net-Centric Infrastructure (NCI) will provide the mechanism for conveyance, information assurance, access, and management. Note that safety considerations may call for different quality of service requirements depending on the type and usage of voice or data packets.

SOPR: FAA   *Primary Supported OIs:* OI-4502, OI-4512

SOCR: *Primary Supported Enablers:* EN-4512

Enabler Group: Aviation Voice and Data Network Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1170: Integrated Ground and Air Network for Voice/Data																	2025	E
EN-1181: Ground Integrated Voice/Data Network - Level 2										E 2017								
EN-1061: Fixed Radio - Data Communications Level 2															E 2022			
EN-1202: Mobile Radio - Data Communications Level 2															E 2022			
R-2128: Applied Research on Integrated Voice/Data and Air/Ground Network Communications																R 2023		

Enabler Listing

EN-1180   Ground Integrated Voice/Data Network - Level 1

Description: The ground-based network provides point-to-point and multipoint Voice Grade (VG) analog services, point-to-point digital services, internet protocol (IP) network services, and switched circuit services over the Common Data Transport (CDT) layer of the Net-Centric Infrastructure (NCI). The CDT network provides the ability to dynamically reroute voice and data channels to improve and maintain the reliability of communications. Note that safety considerations may call for different quality of service requirements depending on the type and usage of voice or data packets. It supports the ability to dynamically switch among several telecommunications providers in order to meet quality of service requirements. The CDT network monitors, controls, and restores the connectivity, in addition to, measuring network performance, and accommodate legacy systems. It provides detection, interception, and prevention of unauthorized users and protection of sensitive data. The Level 1 Initial Operational Capabilities (IOC) provide the initial deployment necessary to support Level 1 services on the NCI.

SOPR: FAA   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-0300, EN-1003, EN-1006, EN-1049, EN-1181, EN-3036

Enabler Group: Aviation Voice and Data Network Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1180: Ground Integrated Voice/Data Network - Level 1	E 2008																	

EN-1181   Ground Integrated Voice/Data Network - Level 2

Description: The ground-based network provides the integrated Voice Over Internet Protocol (VoIP), data, and video internet protocol (IP) network services over the common data transport (CDT) layer of the Net-Centric Infrastructure (NCI). The CDT network provides the capability to uniquely address and access voice, data, video channel communications. It supports the capability to establish the communications connectivity between ground-to-air addressable systems. As in Level 1, quality of service is a major consideration. Quality of service features include dynamic switching and rerouting as needed. Quality of service levels may vary depending on the type and usage of voice or data packets, as appropriate to support safety of operations. The Level 2 Initial Operational Capabilities (IOC) leverages and inherits all Level 1 capabilities, and provides the enhancements necessary to support the integrated Level 2 services on the NCI.

SOPR: FAA   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-1170

Enabler Group: Aviation Voice and Data Network Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1181: Ground Integrated Voice/Data Network - Level 2										E 2017								
EN-1180: Ground Integrated Voice/Data Network - Level 1	E 2008																	
EN-1231: NextGen Enterprise Network - FAA				E 2011														

EN-1190   Radio Data Link - Legacy General Aviation UAT

Description: The Universal Access Transceiver (UAT) is an existing data link technology with associated spectrum and communications protocols. Compatible equipment is currently installed on some General Aviation aircraft and in some National Airspace System (NAS) ground equipment. UAT technology is an enabler for some types of types of surveillance and air traffic management (ATM) (i.e. Automatic Dependent Surveillance-Broadcast (ADS-B), Traffic Information Service-Broadcast (TIS-B), etc.) and may be useful for other future purposes.

SOPR: FAA   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-1023, EN-1400

Enabler Group: Radio-Based Communications Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1190: Radio Data Link - Legacy General Aviation UAT	E 2008																	
EN-1045: Space Based Augmentation System - WAAS	E 2008																	
EN-1160: Space Based Navigation System - GPS Legacy	E 2008																	

Enabler Listing

EN-1201   Mobile Radio - Data Communications Level 1

Description: Airborne Very High Frequency (VHF) Digital Link - Mode 2 (VDL-2) radio is used by pilots for normal flight operations. VDL-2 is a data communications technology designed to support safety-critical Air Traffic Control (ATC) applications. It replaces the aging ACARS technology and represents the latest generation of ATC data communications. Subject to bandwidth limitations, VDL-2 can provide a link for many types of air-ground data exchanges (e.g. controller-pilot messages, trajectories, flight information, etc.). This initial availability date represents the first operational use of the radio, not the date of mandated fleet equipage.

SOPR: Industry	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-0028, EN-1202, EN-1203, EN-1204, EN-1205, EN-1206, EN-1207, EN-1208, EN-1209, EN-1210, EN-1211, EN-1212, EN-1213, EN-1214, EN-1215, EN-1216, EN-1217, EN-1219, EN-1220, EN-1221, EN-1223, EN-1224, EN-1225, EN-2070

Enabler Group: Radio-Based Communications Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
PI-0021: Protection of Data Shared Over-The-Air		P 2009																

EN-1202   Mobile Radio - Data Communications Level 2

Description: Next generation of airborne radios that support advanced and safety-critical data communication for flight operations. This represents the next generation of data communications and is expected to offer higher bandwidth operation worldwide. The new radios will incorporate space weather mitigation capabilities. In order to achieve this higher bandwidth, spectrum reassignment or new spectrum allocation may be required. This may include new integration capabilities such as voice/data integration and ground/air network integration. There also may be new data exchanges such as high-resolution weather data. Details will emerge as research is completed and key decisions are made. The initial availability date represents the first operational use of the radio and not the date of full fleet equipage.

SOPR: Industry	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-1170

Enabler Group: Radio-Based Communications Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1202: Mobile Radio - Data Communications Level 2															E 2022			
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1010: Future Radio Spectrum					E 2012													
PI-0014: Aircraft Equipage Implementation Policy		P 2009																
PI-0115: NextGen Safety Assessment/Certification - Synchronization of Aircraft and ANS			P 2010															
PI-0116: NextGen Safety Assessment/Certification - Standards and Tools			P 2010															
PI-0117: NextGen Safety Assessment/Certification - Resources			P 2010															

EN-1203   Air - Ground Data Exchange - Data Communications Management Services - Tower

Description: This enabler provides Tower air /ground data exchange for data communications management services consisting of the following types of data exchanges: (1) Data Link Logon - A service to initiate a data connection between aircraft and Air Navigation Service Providers (ANSP) that enables the exchange of application information. It is used to uniquely identify an aircraft and to provide version and address information for all data communications services. (2) Air Traffic Control (ATC) Communications Management - The means to exchange requests to initiate and terminate air-ground control communications, indication of the next data authority, and voice frequency contact and monitor messages.

SOPR: FAA	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-1206, EN-1207, EN-1208, EN-1215, EN-1219, EN-1224, EN-1225

Enabler Group: Air-Ground Data Exchange Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1203: Air - Ground Data Exchange - Data Communications Management Services - Tower					E 2012													
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1062: Mobile Data Communications Management Applications - Level 1					E 2012													
PI-0017: Communications Architecture Plan for Ground, Space, Airborne, and/or		P 2009																
PI-0021: Protection of Data Shared Over-The-Air		P 2009																

EN-1204   Air - Ground Data Exchange – Data Communications Management Services – En Route

Description: This enabler provides En Route air /ground data exchange for data communications management services consisting of the following types of data exchanges: (1) Data Link Logon – A service to initiate a data connection between aircraft and Air Navigation Service Provider's (ANSP) that enables the exchange of application information. It is used to uniquely identify an aircraft and to provide version and address information for all data communications services. (2) Air Traffic Control (ATC) Communications Management – The means to exchange requests to initiate and terminate air-ground control communications, indication of the next data authority, and voice frequency contact and monitor messages.

        SOPR: FAA   *Primary Supported OIs:*

        SOCR: *Primary Supported Enablers:* EN-1209, EN-1210, EN-1211, EN-1216, EN-1220, EN-1221, EN-1224, EN-1225

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1204: Air - Ground Data Exchange – Data Communications Management Services – En Route							E 2014											
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1062: Mobile Data Communications Management Applications - Level 1					E 2012													
PI-0017: Communications Architecture Plan for Ground, Space, Airborne, and/or		P 2009																
PI-0021: Protection of Data Shared Over-The-Air		P 2009																

EN-1205   Air - Ground Data Exchange – Data Communications Management Services – TRACON

Description: This enabler provides Terminal Radar Approach Control (TRACON) air /ground data exchange for data communications management services consisting of the following types of data exchanges: (1) Data Link Logon – A service to initiate a data connection between aircraft and Air Navigation Service Provider's (ANSP) that enables the exchange of application information. It is used to uniquely identify an aircraft and to provide version and address information for all data communications services. (2) Air Traffic Control (ATC) Communications Management – The means to exchange requests to initiate and terminate air-ground control communications, indication of the next data authority, and voice frequency contact and monitor messages.

        SOPR: FAA   *Primary Supported OIs:*

        SOCR: *Primary Supported Enablers:* EN-1212, EN-1213, EN-1214, EN-1217, EN-1223, EN-1224, EN-1225

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1205: Air - Ground Data Exchange – Data Communications Management Services – TRACON										E 2017								
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1063: Mobile Data Communications Management Applications - Level 2										E 2017								
PI-0017: Communications Architecture Plan for Ground, Space, Airborne, and/or		P 2009																
PI-0021: Protection of Data Shared Over-The-Air		P 2009																

Enabler Listing

EN-1206   Air - Ground Data Exchange – Clearance and Instruction Services – Tower Group 1

Description: This enabler provides Tower air /ground data exchange for clearance and instructions services consisting of the following types of data exchanges: (1) Air traffic Control (ATC) Clearance - ATC clearances, instructions, flight crew requests, reports, notifications, and compliance indications. (2) Departure Clearance - Departure clearances and revisions, flight crew clearance requests and compliance indications (3) Data Link Taxi (Departure) - Taxi clearances, instructions, flight crew requests, reports, notifications, and compliance indications. (4) Free Text Messages - Such as ATC Microphone Check via an uplink of instruction to check for a stuck microphone.

SOPR: FAA   *Primary Supported OIs:* OI-0321, OI-0327, OI-0339, OI-0340, OI-0406, OI-0408

SOCR: *Primary Supported Enablers:* EN-0009, EN-0026

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1206: Air - Ground Data Exchange – Clearance and Instruction Services – Tower Group 1					E	2012												
EN-1201: Mobile Radio - Data Communications Level 1		E	2009															
EN-1033: Fixed Radio - Data Communications Level 1				E	2010													
EN-1062: Mobile Data Communications Management Applications - Level 1					E	2012												
EN-1203: Air - Ground Data Exchange - Data Communications Management Services - Tower					E	2012												
D-0360: Requirements for Taxi Instructions Submission			D	2010														

EN-1207   Air - Ground Data Exchange – Clearance and Instruction Services – Tower Group 2

Description: This enabler provides Tower air /ground data exchange for clearance and instructions services consisting of the following types of data exchanges: (1) Data Link Taxi (Arrival) - Taxi clearances, instructions, flight crew requests, reports, notifications, and compliance indications. (2) Common Trajectory Coordination - Initial Four-Dimensional Trajectories (4DT) in mixed capability airspace and 4DT agreements in performance-based airspace consisting of trajectory constraints, trajectory requests, trajectory clearances, and trajectory non-conformance reports.

SOPR: FAA   *Primary Supported OIs:* OI-0327, OI-0339, OI-0340, OI-0358, OI-0360, OI-0406

SOCR: *Primary Supported Enablers:* EN-0009, EN-0017

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1207: Air - Ground Data Exchange – Clearance and Instruction Services – Tower Group 2										E	2017							
EN-1201: Mobile Radio - Data Communications Level 1		E	2009															
EN-0016: Separation/Trajectory Management Detail Operational Concept			E	2010														
EN-1033: Fixed Radio - Data Communications Level 1			E	2010														
EN-1203: Air - Ground Data Exchange - Data Communications Management Services - Tower					E	2012												
EN-1063: Mobile Data Communications Management Applications - Level 2										E	2017							
D-2129: Required Aircraft 4DT Intent Data								D	2015									

EN-1208   Air - Ground Data Exchange – Clearance and Instruction Services – Tower Group 3

Description: This enabler provides Tower air /ground data exchange for clearance and instructions services consisting of the following types of data exchanges: Common Trajectory Coordination - Widespread use of Four Dimensional Trajectory (4DT) agreements down to paired approach consisting of trajectory constraints, trajectory requests, trajectory clearances, and trajectory non-conformance reports.

SOPR: FAA   *Primary Supported OIs:* OI-0348, OI-0362

SOCR: *Primary Supported Enablers:* EN-0009

Enabler Group: Air-Ground Data Exchange Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1208: Air - Ground Data Exchange – Clearance and Instruction Services – Tower Group 3															E 2022			
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1203: Air - Ground Data Exchange - Data Communications Management Services - Tower					E 2012													
EN-1064: Mobile Data Communications Management Applications - Level 3															E 2022			

EN-1209   Air - Ground Data Exchange – Clearance and Instructions Services – En Route Group 1

Description: This enabler provides En Route air /ground data exchange for clearance and instructions services consisting of the following types of data exchanges: (1) Air Traffic Control (ATC) Clearance - ATC clearances, instructions, flight crew requests, reports, notifications, and compliance indications. (2) Free Text Messages - Such as ATC Microphone Check via an uplink of instruction to check for a stuck microphone.

       SOPR: FAA   *Primary Supported OIs:* OI-0337, OI-0352

       SOCR: *Primary Supported Enablers:*

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1209: Air - Ground Data Exchange – Clearance and Instructions Services – En Route Group 1							E 2014											
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1062: Mobile Data Communications Management Applications - Level 1					E 2012													
EN-1204: Air - Ground Data Exchange – Data Communications Management Services – En Route							E 2014											

EN-1210   Air - Ground Data Exchange - Clearance and Instructions Services - En Route Group 2

Description: This enabler provides En Route air /ground data exchange for clearance and instructions services consisting of the following types of data exchanges: (1) Common Trajectory Coordination - Initial Four-Dimensional Trajectories (4DT) in mixed capability airspace and 4DT agreements in performance-based airspace consisting of trajectory constraints, trajectory requests, trajectory clearances, and trajectory non-conformance reports. (2) Downstream Clearance - Downstream clearances, instructions, flight crew requests, reports, notifications, and compliance indications.

       SOPR: FAA   *Primary Supported OIs:* OI-0339, OI-0350, OI-0358, OI-0360

       SOCR: *Primary Supported Enablers:* EN-0017

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1210: Air - Ground Data Exchange - Clearance and Instructions Services - En Route Group 2											E 2018							
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1204: Air - Ground Data Exchange – Data Communications Management Services – En Route							E 2014											
EN-1063: Mobile Data Communications Management Applications - Level 2										E 2017								
D-2129: Required Aircraft 4DT Intent Data									D 2016									

EN-1211   Air - Ground Data Exchange - Clearance and Instructions Services - En Route Group 3

Description: This enabler provides En Route air /ground data exchange for clearance and instructions services consisting of the following types of data exchanges: Common Trajectory Coordination - Widespread use of Four-Dimensional Trajectory (4DT) agreements down to paired approach consisting of trajectory constraints, trajectory requests, trajectory clearances, and trajectory non-conformance reports.

       SOPR: FAA   *Primary Supported OIs:* OI-0362

       SOCR: *Primary Supported Enablers:*

Enabler Group: Air-Ground Data Exchange Enablers

Enabler Listing																		

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1211: Air - Ground Data Exchange - Clearance and Instructions Services - En Route Group 3															E 2022			
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1204: Air - Ground Data Exchange – Data Communications Management Services – En Route							E 2014											
EN-1064: Mobile Data Communications Management Applications - Level 3															E 2022			

EN-1212 Air - Ground Data Exchange – Clearance and Instructions Services – TRACON Group 1

Description: This enabler provides Terminal Radar Approach Control (TRACON) air /ground data exchange for clearance and instructions services consisting of the following types of data exchanges: (1) Air Traffic Control (ATC) Clearance - ATC clearances, instructions, flight crew requests, reports, notifications, and compliance indications. (2) Free Text Messages - Such as ATC Microphone Check via an uplink of instruction to check for a stuck microphone.

> *SOPR:* FAA *Primary Supported OIs:* OI-0327, OI-0340, OI-0406
>
> *SOCR:* *Primary Supported Enablers:* EN-0009

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1212: Air - Ground Data Exchange – Clearance and Instructions Services – TRACON Group 1										E 2017								
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1063: Mobile Data Communications Management Applications - Level 2										E 2017								
EN-1205: Air - Ground Data Exchange – Data Communications Management Services – TRACON										E 2017								

EN-1213 Air - Ground Data Exchange – Clearance and Instructions Services – TRACON Group 2

Description: This enabler provides Terminal Radar Approach Control (TRACON) air /ground data exchange for clearance and instructions services consisting of the following types of data exchanges: (1) Data Link Taxi (Arrival) - Taxi clearances, instructions, flight crew requests, reports, notifications, and compliance indications. (2) Common Trajectory Coordination - Initial Four-Dimensional Trajectories (4DT) in mixed capability airspace and 4DT agreements in performance-based airspace consisting of trajectory constraints, trajectory requests, trajectory clearances, and trajectory non-conformance reports.

> *SOPR:* FAA *Primary Supported OIs:* OI-0327, OI-0339, OI-0340, OI-0358, OI-0360, OI-0406
>
> *SOCR:* *Primary Supported Enablers:* EN-0009, EN-0017

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1213: Air - Ground Data Exchange – Clearance and Instructions Services – TRACON Group 2										E 2017								
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1063: Mobile Data Communications Management Applications - Level 2										E 2017								
EN-1205: Air - Ground Data Exchange – Data Communications Management Services – TRACON										E 2017								
D-2129: Required Aircraft 4DT Intent Data								D 2015										

Enabler Listing

EN-1214   Air - Ground Data Exchange – Clearance and Instructions Services – TRACON Group 3

Description: This enabler provides Terminal Radar Approach Control (TRACON) air /ground data exchange service for clearance and instructions services consisting of the following types of data exchanges: Common Trajectory Coordination - Widespread use of Four-Dimensional Trajectory (4DT) agreements down to paired approach consisting of trajectory constraints, trajectory requests, trajectory clearances, and trajectory non-conformance reports.

SOPR: FAA   *Primary Supported OIs:* OI-0348, OI-0362
SOCR: *Primary Supported Enablers:* EN-0009

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1214: Air - Ground Data Exchange – Clearance and Instructions Services – TRACON Group 3															E 2022			
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-0016: Separation/Trajectory Management Detail Operational Concept			E 2010															
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1205: Air - Ground Data Exchange – Data Communications Management Services – TRACON									E 2017									
EN-1064: Mobile Data Communications Management Applications - Level 3															E 2022			

EN-1215   Air - Ground Data Exchange – FIS – Tower

Description: This enabler provides Tower air /ground data exchange for Flight Information Services (FIS) consisting of the following data exchange: Data Link Automatic Terminal Information Service (D-ATIS) - Downlink of request for reports; uplink of contract acknowledgements; uplink of arrival, departure, or combined ATIS reports. ATIS reports contain air traffic information including: meteorological conditions, operating procedures, runways and approaches in use, and various other information which may affect any phase of flight as well as surface operations.

SOPR: FAA   *Primary Supported OIs:* OI-0334, OI-0408, OI-0409, OI-0410
SOCR: *Primary Supported Enablers:*

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1215: Air - Ground Data Exchange – FIS – Tower					E 2012													
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1062: Mobile Data Communications Management Applications - Level 1					E 2012													
EN-1203: Air - Ground Data Exchange - Data Communications Management Services - Tower					E 2012													

EN-1216   Air - Ground Data Exchange – FIS – En Route

Description: This enabler provides En Route air /ground data exchange for flight information services consisting of the following data exchange: Data Link Automatic Terminal Information Service (D-ATIS) - Downlink of request for reports; uplink of contract acknowledgements; uplink of arrival, departure, or combined ATIS reports. ATIS reports contain air traffic information including: meteorological conditions, operating procedures, runways and approaches in use, and various other information which may affect any phase of flight as well as surface operations.

SOPR: FAA   *Primary Supported OIs:* OI-0306
SOCR: *Primary Supported Enablers:*

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1216: Air - Ground Data Exchange – FIS – En Route							E 2014											
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1062: Mobile Data Communications Management Applications - Level 1					E 2012													
EN-1204: Air - Ground Data Exchange – Data Communications Management Services – En Route							E 2014											

Enabler Listing

EN-1217   Air - Ground Data Exchange – FIS – TRACON

Description: This enabler provides Terminal Radar Approach Control (TRACON) air /ground data exchange for Flight Information Services (FIS) domain consisting of the following data exchange: Data Link Automatic Terminal Information Service (D-ATIS) - Downlink of request for reports; uplink of contract acknowledgements; uplink of arrival, departure, or combined Automatic Terminal Information Service (ATIS) reports. ATIS reports contain air traffic information including: meteorological conditions, operating procedures, runways and approaches in use, and various other information which may affect any phase of flight as well as surface operations.

> *SOPR:* FAA   *Primary Supported OIs:* OI-0306, OI-0381
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1217: Air - Ground Data Exchange – FIS – TRACON										E 2017								
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1063: Mobile Data Communications Management Applications - Level 2										E 2017								
EN-1205: Air - Ground Data Exchange – Data Communications Management Services – TRACON										E 2017								

EN-1219   Air - Ground Data Exchange – Advisory Services – Tower

Description: This enabler provides Tower air /ground data exchange for advisory services consisting of the following data exchange: Data Link Flight Update – Uplink of Air Traffic Management (ATM) related operational data and information to optimize flight operations such as flight-specific information related to the departure sequence, slot-time allocations, flow management advisories, airspace/airport configurations, Notices to Airmen (NOTAMs), and special operations such as de-icing.

> *SOPR:* FAA   *Primary Supported OIs:* OI-0331
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1219: Air - Ground Data Exchange – Advisory Services – Tower										E 2017								
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1203: Air - Ground Data Exchange - Data Communications Management Services - Tower					E 2012													
EN-1063: Mobile Data Communications Management Applications - Level 2										E 2017								

EN-1220   Air - Ground Data Exchange – Advisory Services – En Route Group 1

Description: This enabler provides En Route air /ground data exchange for advisory services consisting of the following data exchange: Arrival Manager Information Delivery Service - Uplink of target, expected, or revised controlled arrival time advisories relevant to the destination airport or points in space along the aircraft's route.

> *SOPR:* FAA   *Primary Supported OIs:* OI-0325
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1220: Air - Ground Data Exchange – Advisory Services – En Route Group 1							E 2014											
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1062: Mobile Data Communications Management Applications - Level 1					E 2012													
EN-1204: Air - Ground Data Exchange – Data Communications Management Services – En Route							E 2014											

Enabler Listing

EN-1221   Air - Ground Data Exchange – Advisory Services – En Route Group 2

Description: This enabler provides En Route air /ground data exchange for advisory services consisting of the following data exchange: Data Link Flight Update – Uplink of Air Traffic Management (ATM) related operational data and information to optimize flight operations such as flight-specific information related to the departure sequence, slot-time allocations, flow management advisories, airspace/airport configurations, Notices to Airmen (NOTAMs), and special operations such as de-icing.

> *SOPR:* FAA   *Primary Supported OIs:* OI-0331
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1221: Air - Ground Data Exchange – Advisory Services – En Route Group 2											E 2018							
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1204: Air - Ground Data Exchange – Data Communications Management Services – En Route							E 2014											
EN-1063: Mobile Data Communications Management Applications - Level 2										E 2017								

EN-1223   Air - Ground Data Exchange – Advisory Services – TRACON

Description: This enabler provides Terminal Radar Approach Control (TRACON) air /ground data exchange for advisory services consisting of the following data exchange: Data Link Flight Update – Uplink of Air Traffic Management (ATM) related operational data and information to optimize flight operations such as flight-specific information related to the departure sequence, slot-time allocations, flow management advisories, airspace/airport configurations, Notices to Airmen (NOTAMs), and special operations such as de-icing.

> *SOPR:* FAA   *Primary Supported OIs:* OI-0331
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1223: Air - Ground Data Exchange – Advisory Services – TRACON										E 2017								
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1063: Mobile Data Communications Management Applications - Level 2										E 2017								
EN-1205: Air - Ground Data Exchange – Data Communications Management Services – TRACON										E 2017								

EN-1224   Air - Ground Data Exchange – Flight Position Intent Services – Multi Domain

Description: This enabler provides the air /ground data exchange for flight position intent services in all domains consisting of the following data exchange: Flight Path Intent Service – Providing information to an Air Navigation Service Provider (ANSP) for the detection of inconsistencies between the Air Traffic Control (ATC) flight plan and the flight plan activated in the aircraft's Flight Management System (FMS) through the uplink of contract(s) requesting flight path intent data, downlink of contract acknowledgements, downlink of current and predicted position (latitude, longitude, and altitude), ground speed, and up to 128 subsequent waypoints with time, altitude, and speed projections as requested. This service is conducted without flight crew involvement.

> *SOPR:* FAA   *Primary Supported OIs:* OI-0306, OI-0350, OI-0358
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Air-Ground Data Exchange Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1224: Air - Ground Data Exchange – Flight Position Intent Services – Multi Domain											E 2018							
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1203: Air - Ground Data Exchange - Data Communications Management Services - Tower					E 2012													
EN-1204: Air - Ground Data Exchange – Data Communications Management Services – En Route							E 2014											
EN-1063: Mobile Data Communications Management Applications - Level 2										E 2017								
EN-1205: Air - Ground Data Exchange – Data Communications Management Services – TRACON										E 2017								
PI-0021: Protection of Data Shared Over-The-Air		P 2009																

EN-1225   Air - Ground Data Exchange – Delegated Separation Services – Multi Domain

Description: This enabler provides the air /ground data exchange for delegated separation services in all domains consisting of the following types of data exchanges: (1) Single Aircraft - Initiated by a controller issuing an instruction to a single aircraft to perform a maneuver such as In-Trail Procedure (climb, descent, or station-keep); Merging and Spacing; or Crossing and Passing. The aircraft performing the instruction receives the position and intent data from the target aircraft and assumes separation responsibility from the target aircraft. (2) Paired Approach – Initiated by a controller issuing an instruction to a pair of aircraft to perform a simultaneous approach. Both aircraft performing the simultaneous approach exchange position and intent data and assume separation responsibility with the partner aircraft during the procedure.

SOPR: FAA   *Primary Supported OIs:* OI-0362, OI-0363
SOCR: *Primary Supported Enablers:*

Enabler Group: Air-Ground Data Exchange Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1225: Air - Ground Data Exchange – Delegated Separation Services – Multi Domain															E 2022			
EN-1201: Mobile Radio - Data Communications Level 1		E 2009																
EN-1033: Fixed Radio - Data Communications Level 1			E 2010															
EN-1203: Air - Ground Data Exchange - Data Communications Management Services - Tower					E 2012													
EN-1204: Air - Ground Data Exchange – Data Communications Management Services – En Route							E 2014											
EN-1205: Air - Ground Data Exchange – Data Communications Management Services – TRACON										E 2017								
EN-1064: Mobile Data Communications Management Applications - Level 3															E 2022			

EN-1229   Enterprise Networking Governance Model

Description: This is the high-level governance model for guiding enterprise network implementations across agencies. This governance model will describe the governance structure (a body with defined membership and processes) that will define cross-agency requirements related to enterprise networks including network management, infrastructure, and information sharing.

SOPR: DOD   *Primary Supported OIs:*
SOCR: *Primary Supported Enablers:* EN-1230

Enabler Group: Enterprise Networks and Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1229: Enterprise Networking Governance Model		E 2009																

Enabler Listing

EN-1230   Enterprise Networking Governance Structure

Description: A governance structure (a body with defined membership and processes) is established to develop and authorize common requirements related to enterprise networking that will be applied across agencies. The goal of this governance structure is to ensure cross-agency interoperability and standardization while minimally limiting agency flexibility in its implementation decisions. This governance group will publish cross-agency requirements regarding standards and protocols in areas such as enterprise network management, infrastructure, and information sharing.

SOPR: DOD   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-1015, EN-1016, EN-1043, EN-1250, EN-1251, EN-1252, EN-1253, EN-1254, EN-2050, EN-5036

Enabler Group: Enterprise Networks and Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1230: Enterprise Networking Governance Structure			E	2010														
EN-1229: Enterprise Networking Governance Model		E	2009															

EN-1231   NextGen Enterprise Network - FAA

Description: Within the Federal Aviation Administration (FAA) enterprise, NextGen information is managed and shared using a service-oriented enterprise network. As part of the overall NextGen enterprise network, this FAA-specific enterprise network provides internal services, supports internal users, and exchanges NextGen information with non-FAA sources. Current plans envision this FAA enterprise network to operate on the FTI (FAA Telecommunications Infrastructure) with direction from the SWIM (System Wide Information Management) program. This enterprise network: (1) complies with NextGen minimum standards for network management and infrastructure/security services, (2) is deployed on an FAA physical network (links, switches, routers, etc.), (3) is tested and validated, and (4) is specific to FAA operational requirements and supports the delivery of FAA information services. As services are deployed, network managers must ensure that the enterprise network capacity and performance is sufficient to support the Service Level Agreements (SLAs) and quality of service (QoS) requirements associated with the information services. The availability date for this enabler reflects compliance with published NextGen standards.

SOPR: FAA   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-0004, EN-0020, EN-0033, EN-0034, EN-0035, EN-0100, EN-0110, EN-0150, EN-0206, EN-1006, EN-1049, EN-1181, EN-1270, EN-1271, EN-1272, EN-1273, EN-3036, EN-6018

Enabler Group: Enterprise Networks and Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1231: NextGen Enterprise Network - FAA				E	2011													
EN-1015: Enterprise Network Management Standards				E	2011													
EN-1016: Enterprise Networks Infrastructure Services Standards				E	2011													
EN-1043: Enterprise Networks Security Services Standards				E	2011													

EN-1234   NextGen Enterprise Network - DOC

Description: Within the Department of Commerce (DOC) enterprise, NextGen information is managed and shared using a service-oriented enterprise network. As part of the overall NextGen enterprise network, this DOC-specific enterprise network provides internal services, supports internal users, and exchanges NextGen information with non-DOC sources. This enterprise network: (1) complies with NextGen minimum standards for network management and infrastructure/security services, (2) is deployed on a DOC physical network (links, switches, routers, etc.), (3) is tested and validated, and (4) is specific to DOC operational requirements and supports the delivery of DOC information services. As services are deployed, network managers must ensure that the enterprise network capacity and performance is sufficient to support the Service Level Agreements (SLAs) and Quality of Service (QoS) requirements associated with the information services. The availability date for this enabler reflects compliance with published NextGen standards.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2010, EN-2220, EN-2230, EN-2240, EN-2250, EN-2260

Enabler Group: Enterprise Networks and Standards Enablers

Enabler Listing																		
	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1234: NextGen Enterprise Network - DOC				E	2011													
EN-1015: Enterprise Network Management Standards				E	2011													
EN-1016: Enterprise Networks Infrastructure Services Standards				E	2011													
EN-1043: Enterprise Networks Security Services Standards				E	2011													

EN-1237   NextGen Enterprise Network - DOD

Description: Within the Department of Defense (DOD) enterprise, NextGen information is managed and shared using a service-oriented enterprise network. As part of the overall NextGen enterprise network, this DOD-specific enterprise network provides internal services, supports internal users, and exchanges NextGen information with non-DOD sources. The current DOD enterprise network is known as the Global Information Grid (GIG). This enterprise network: (1) complies with NextGen minimum standards for network management and infrastructure/security services, (2) is deployed on a DOD physical network (links, switches, routers, etc.), (3) is tested and validated, and (4) is specific to DOD operational requirements and supports the delivery of DOD information services. As services are deployed, network managers must ensure that the enterprise network capacity and performance is sufficient to support the Service Level Agreements (SLAs) and Quality of Service (QoS) requirements associated with the information services. The availability date for this enabler reflects compliance with published NextGen standards.

> *SOPR:* DOD   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-1003

Enabler Group: Enterprise Networks and Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1237: NextGen Enterprise Network - DOD				E	2011													
EN-1015: Enterprise Network Management Standards				E	2011													
EN-1016: Enterprise Networks Infrastructure Services Standards				E	2011													
EN-1043: Enterprise Networks Security Services Standards				E	2011													

EN-1240   NextGen Enterprise Network - DHS

Description: Within the Department of Homeland Security (DHS) enterprise, NextGen information is managed and shared using a service-oriented enterprise network. As part of the overall NextGen enterprise network, this DHS-specific enterprise network provides internal services, supports internal users, and exchanges NextGen information with non-DHS sources. This enterprise network: (1) complies with NextGen minimum standards for network management and infrastructure/security services, (2) is deployed on a DHS physical network (links, switches, routers, etc.), (3) is tested and validated, and (4) is specific to DHS operational requirements and supports the delivery of DHS information services. As services are deployed, network managers must ensure that the enterprise network capacity and performance is sufficient to support the Service Level Agreements (SLAs) and Quality of Service (QoS) requirements associated with the information services. The availability date for this enabler reflects compliance with published NextGen standards.

> *SOPR:* DHS   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-1274, EN-4120, EN-4500, EN-4510, EN-4520

Enabler Group: Enterprise Networks and Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1240: NextGen Enterprise Network - DHS				E	2011													
EN-1015: Enterprise Network Management Standards				E	2011													
EN-1016: Enterprise Networks Infrastructure Services Standards				E	2011													
EN-1043: Enterprise Networks Security Services Standards				E	2011													

Enabler Listing

EN-1250   Information Sharing Standards: Flow Information

Description: The net-centric governance structure publishes authorized standards for providing and exchanging traffic flow information across the net-centric infrastructure of the NextGen enterprise. These standards define the technical vocabulary, schemas, metadata, business processes, and related specifications essential to the net-centric exchange of traffic flow information. Traffic flow information includes: route status, flow information, and related airport information such as Runway Visual Ranges (RVRs). These standards enable services to share information in a consistent and uniform way.

SOPR: FAA   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-1270

Enabler Group: Information Sharing Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1250: Information Sharing Standards: Flow Information			E	2010														
EN-1230: Enterprise Networking Governance Structure			E	2010														

EN-1251   Information Sharing Standards: Flight and Surveillance Information

Description: The net-centric governance structure publishes authorized standards for providing and exchanging flight and surveillance information across the Net-Centric Infrastructure (NCI) of the NextGen enterprise. These standards define the technical vocabulary, schemas, metadata, business processes, and related specifications essential to the net-centric exchange of flight and surveillance information. Flight and surveillance information includes: flight plan data, surveillance for airborne and surface traffic (cooperative and non-cooperative), clearance delivery, and taxi status. These standards enable services to share information in a consistent and uniform way.

SOPR: FAA   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-0034, EN-1002, EN-1003, EN-1005, EN-1006, EN-1271

Enabler Group: Information Sharing Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1251: Information Sharing Standards: Flight and Surveillance Information			E	2010														
EN-1230: Enterprise Networking Governance Structure			E	2010														
PI-0009: National Integrated Surveillance Plan	P	2008																

EN-1252   Information Sharing Standards: Airspace Information

Description: The net-centric governance structure publishes authorized standards for providing and exchanging airspace information across the Net-Centric Infrastructure (NCI) of the NextGen enterprise. These standards define the technical vocabulary, schemas, metadata, business processes, and related specifications essential to the net-centric exchange of airspace information. Airspace information includes: Special Use Airspace (SUA) configuration and security-restricted airspace. These standards enable services to share information in a consistent and uniform way.

SOPR: FAA   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-1272, EN-4512

Enabler Group: Information Sharing Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1252: Information Sharing Standards: Airspace Information			E	2010														
EN-1230: Enterprise Networking Governance Structure			E	2010														

Enabler Listing

EN-1253   Information Sharing Standards: Aviation Safety Information

Description: The net-centric governance structure publishes authorized standards for providing and exchanging aviation safety information across the Net-Centric Infrastructure of the NextGen enterprise. These standards define the technical vocabulary, schemas, metadata, business processes, and related specifications essential to the net-centric exchange of aviation safety information. Aviation safety information includes safety metrics and analyses that support aviation decision makers. These standards enable services to share information in a consistent and uniform way.

>   *SOPR:* FAA   *Primary Supported OIs:*
>   *SOCR:*   *Primary Supported Enablers:* EN-3036

Enabler Group: Information Sharing Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1253: Information Sharing Standards: Aviation Safety Information			E	2010														
EN-1230: Enterprise Networking Governance Structure			E	2010														

EN-1254   Information Sharing Standards: Security Information

Description: The net-centric governance structure publishes authorized standards for providing and exchanging security information across the Net-Centric Infrastructure (NCI) of the NextGen enterprise. These standards define the technical vocabulary, schemas, metadata, business processes, and related specifications essential to the net-centric exchange of security information. Security information includes: passenger/baggage check-in, passenger/baggage security screening, flight risk data and metrics. These standards enabler services to share information in a consistent and uniform way.

>   *SOPR:* DHS   *Primary Supported OIs:*
>   *SOCR:*   *Primary Supported Enablers:* EN-1274, EN-4120, EN-4500, EN-4510, EN-4520

Enabler Group: Information Sharing Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1254: Information Sharing Standards: Security Information					E	2012												
EN-1230: Enterprise Networking Governance Structure			E	2010														

EN-1270   Flow Information Services - FAA Group 1

Description: This enabler provides the initial group of services for the Federal Aviation Administration (FAA) delivery of flow information including: route status, traffic flow, and runway visual range information. Route status includes current information on adapted arrival and departure routes. Traffic flow information includes current and planned traffic flow constraints, traffic flow programs, and ground delay programs. Runway visual range information includes current Runway Visual Range (RVR) values for airports across the National Airspace System (NAS). These information services are implemented on the FAA's enterprise network, where they can be accessed by outside users (other agencies, third parties) via authorized gateways/portals.

>   *SOPR:* FAA   *Primary Supported OIs:* OI-0350, OI-0360
>   *SOCR:*   *Primary Supported Enablers:* EN-0006, EN-0033, EN-0034, EN-0171, EN-0206

Enabler Group: Aeronautical Information Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1270: Flow Information Services - FAA Group 1				E	2011													
EN-1250: Information Sharing Standards: Flow Information			E	2010														
EN-1231: NextGen Enterprise Network - FAA				E	2011													

Enabler Listing

EN-1271   Flight and Surveillance Information Services - FAA Group 1

Description: This enabler provides the initial group of services for the Federal Aviation Administration (FAA) delivery of flight and surveillance information. Flight information includes flight plan data (aircraft identification, planned routes and times, etc.). Surveillance information includes current aircraft track data (position and other real time characteristics) for the en route and surface domains. Clearance delivery and taxi status information is also available. These information services are implemented on the FAA's enterprise network, where they can be accessed by outside users (other agencies, third parties) via authorized gateways/portals.

SOPR: FAA   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-0002, EN-0004, EN-0005, EN-0009, EN-0021, EN-0033, EN-0034, EN-0035, EN-0206, EN-3036, EN-3068, EN-3070, EN-5004, EN-5008

Enabler Group: Aeronautical Information Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E 2011														
EN-1025: Airport Surface Surveillance - Legacy ASDE-X	E 2008																	
EN-1251: Information Sharing Standards: Flight and Surveillance Information			E 2010															
EN-1231: NextGen Enterprise Network - FAA				E 2011														

EN-1272   Aeronautical Information Services (AIS) - FAA Group 1

Description: This enabler provides the initial group of services for the Federal Aviation Administration (FAA) delivery of aeronautical information including Special Use Airspace (SUA) status and configuration (open/closed, geometry, etc.). These information services are implemented on the FAA's enterprise network, where it can be accessed by outside users (other agencies, third parties) via authorized gateways/portals.

SOPR: FAA   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-0033, EN-0034, EN-0171, EN-0206

Enabler Group: Aeronautical Information Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1272: Aeronautical Information Services (AIS) - FAA Group 1				E 2011														
EN-1252: Information Sharing Standards: Airspace Information			E 2010															
EN-1231: NextGen Enterprise Network - FAA				E 2011														

EN-1273   NextGen Weather Information Services - FAA Group 1

Description: This enabler provides the initial group of services for the Federal Aviation Administration (FAA) delivery of weather information including: Pilot Weather Reports (PIREPs), Integrated Terminal Weather System (ITWS) products, and Corridor Integrated Weather System (CIWS) products. ITWS and CIWS focus on convective weather near airports and en route, respectively. These information services are implemented on the FAA's enterprise network, where they can be accessed by outside users (other agencies, third parties) via authorized gateways/portals.

SOPR: FAA   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-0004, EN-0006, EN-0029, EN-0033, EN-0034, EN-0150, EN-2010, EN-2060

Enabler Group: Weather Information and Dissemination Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1273: NextGen Weather Information Services - FAA Group 1				E 2011														
EN-2050: Information Sharing Standards: Weather Information			E 2010															
EN-1231: NextGen Enterprise Network - FAA				E 2011														

Enabler Listing

EN-1274   NextGen Security Information Services - DHS Group 1

Description: This enabler provides the initial group of services for the Department of Homeland Security (DHS) delivery of security information including: passenger/baggage check-in status and passenger/baggage screening results. Check-in information services accept check-in information from airlines, and provide check-in information to authorized users. Passenger/baggage security screening information services accept screening information from internal (DHS) users and authorized third parties, and provide screening information to authorized users. These information services are implemented on DHS's enterprise network, where they can be accessed by outside users (other agencies, third parties) via authorized gateways/portals.

SOPR: DHS	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-4116, EN-4121, EN-4510, EN-4520, EN-4521, EN-5030

Enabler Group: Integrated Risk Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1274: NextGen Security Information Services - DHS Group 1					E 2012													
EN-1240: NextGen Enterprise Network - DHS				E 2011														
EN-1254: Information Sharing Standards: Security Information					E 2012													

EN-1400   Cooperative Surveillance - ADS-B IN/TIS-B/FIS-B Level 1

Description: The Automatic Dependent Surveillance - Broadcast (ADS-B) IN capability enables aircraft to receive Flight Information Service-Broadcast (FIS-B) and Traffic Information Service-Broadcast (TIS-B) from the ADS-B OUT service. It provides properly equipped aircraft (ADS-B IN) access to cooperative surveillance information from all aircraft in vicinity airspace to support traffic situation awareness and performance-based operations such as delegated separation for pair-wise maneuvers and paired approaches, and operation in self-separation airspace. Segment 1 (2007 - 2010): - Begin Avionics Equipage: FY 2007 - Additional Aircraft to Aircraft Requirements Definition: FY 2007 - FY 2010 - Begin Initial Aircraft to Aircraft Application Deployment: FY 2008

SOPR: Industry	*Primary Supported OIs:* OI-0326, OI-0337, OI-0355, OI-0361, OI-0409, OI-0410
SOCR:	*Primary Supported Enablers:* EN-0200, EN-1006, EN-1503

Enabler Group: Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1400: Cooperative Surveillance - ADS-B IN/TIS-B/FIS-B Level 1			E 2010															
EN-1190: Radio Data Link - Legacy General Aviation UAT	E 2008																	
EN-1023: Cooperative Surveillance - ADS-B Out Level 1			E 2010															
PI-0009: National Integrated Surveillance Plan	P 2008																	
PI-0120: PNT Performance Requirements	P 2008																	
PI-0010: National Surveillance Strategy		P 2009																
PI-0014: Aircraft Equipage Implementation Policy		P 2009																
PI-0021: Protection of Data Shared Over-The-Air		P 2009																
PI-0022: GPS Policy to Support Civil NextGen PNT Requirements			P 2010															
PI-0115: NextGen Safety Assessment/Certification - Synchronization of Aircraft and ANS			P 2010															

Enabler Listing

EN-1401   Backup Surveillance System

Description: This system provides the Secondary Surveillance Radar replacement for the Mode Select Beacon System (Mode S) and Air Traffic Control Beacon Interrogator-6 (ACTBI-6). This cooperative based surveillance system must provide backup in case of Global Positioning System (GPS) loss that support ADS-B. By 2014, the Federal Aviation Administration (FAA) has a decision milestone calling for en route and limited terminal replacement of legacy beacons (Mode S), and removal of remaining systems (Mode S, ATCBI-4/5). The current FAA Surveillance Roadmap calls for the beginning of decommissions in 2018 with the end of service life expected to be 2020. By 2024, the FAA has a decision milestone for replacement of en route beacons (ATCBI-6).

SOPR: FAA	*Primary Supported OIs:* OI-0317, OI-0322, OI-0334, OI-0340, OI-0341, OI-0381
SOCR:	*Primary Supported Enablers:*

Enabler Group: Integrated Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1401: Backup Surveillance System							E	2014										
EN-1402: Integrated Surveillance Strategy	E	2008																
PI-0009: National Integrated Surveillance Plan	P	2008																
PI-0010: National Surveillance Strategy		P	2009															

EN-1402   Integrated Surveillance Strategy

Description: In accordance with the President's approved National Strategy for Aviation Security, under the Air Domain Surveillance and Intelligence Integration (ADSII) plan, the Department of Transportation (DOT) and supporting agencies shall develop a coordinated air surveillance implementation plan, which recommends solutions to address any gaps in aviation security requirements. At a minimum, this plan should address: Sustainment and improvement of current air surveillance capabilities. Options for enhancement of current air surveillance capabilities for low altitude coverage in areas of national interest. Interagency responsibilities to detect, monitor, track, and identify all aircraft, both cooperative and non-cooperative, in or approaching U.S. airspace. Recommended solutions, including those associated with cost sharing, to address identified surveillance gaps. Development of next generation surveillance and detection capabilities. Transition to future surveillance capabilities. Identify appropriate agencies to implement the plan within a specified timeline.

SOPR: DOT	*Primary Supported OIs:* OI-4204
SOCR:	*Primary Supported Enablers:* EN-1401

Enabler Group: Integrated Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1402: Integrated Surveillance Strategy	E	2008																
PI-0009: National Integrated Surveillance Plan	P	2008																
PI-0120: PNT Performance Requirements	P	2008																

EN-1404   Cooperative Surveillance - PRM Level 2

Description: The original Precision Runway Monitor (PRM) system allows simultaneous independent approaches on closely spaced parallel runways less than 4,300 feet apart, returning a portion of lost capacity during adverse weather conditions and thereby reducing delays. The PRM system is an accurate electronic Scan radar that tracks and processes aircraft targets in a one second update rate (as opposed to 4.8 seconds with conventional radars). The PRM system provides the controller with automatic alerts and high resolution displays that, in conjunction with specific procedures, enable pilots to fly simultaneous independent approaches to parallel runways spaced less than 4,300 feet. The Level 2 PRM provides multilateration as an alternative technology to replace the Level 1 PRM electronic scan radar.

SOPR: FAA	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-1506

Enabler Group: Cooperative Surveillance Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1404: Cooperative Surveillance - PRM Level 2		E	2009															
EN-1024: Cooperative Surveillance - PRM Level 1	E	2008																
EN-1405: Cooperative Surveillance (Multilateration)		E	2009															
PI-0120: PNT Performance Requirements	P	2008																

EN-1405   Cooperative Surveillance (Multilateration)

Description: The Multilateration (MLAT) subsystem is a beacon based, cooperative surveillance sensor that provides target positions throughout the defined coverage volume. The MLAT subsystem provides accurate position and identification information on transponder-equipped aircraft and transponder-equipped surface vehicles by performing multilateration on signals transmitted by the transponder. The MLAT data would be formatted and sent to appropriate facilities equipped with an existing integrated Standard Terminal Automation Replacement System (STARS) display to accomplish the precision runway monitoring functionality.

      SOPR: FAA   ***Primary Supported OIs:***

      SOCR: ***Primary Supported Enablers:*** EN-1404, EN-1506

Enabler Group: Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1405: Cooperative Surveillance (Multilateration)		E	2009															
PI-0120: PNT Performance Requirements	P	2008																
PI-0010: National Surveillance Strategy	P	2009																

EN-1406   Airport Surveillance Video

Description: The video service provides visual surveillance of airport property to support remote controller service, surface management, and security. This is an Internet Protocol (IP)-based wireless surveillance system that enables airport security operations centers to simultaneously monitor distant sites, including secured airport areas, public parking lots, movement areas, and roadway tunnels. In addition, wireless cameras are situated at remote parking lots, on gates around the perimeter of the airport and in public tunnels leading to the airport and located beneath vulnerable, active taxi ways. These cameras track anomalous activities within the airport property.

      SOPR: Industry   ***Primary Supported OIs:***

      SOCR: ***Primary Supported Enablers:*** EN-1003, EN-4201, EN-4204

Enabler Group: Non-Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1406: Airport Surveillance Video			E	2010														

EN-1500   Cooperative Surveillance - ADS-B Out Level 2

Description: The Automatic Dependent Surveillance-Broadcast (ADS-B) cooperative system provides surveillance and situational awareness simultaneously to pilots and Air Traffic Control (ATC) facilities. This Global Positioning System (GPS)-based system enables aircraft equipment to determine an aircraft's multidimensional position within airspace or on the surface of an airport. This data is then transmitted by the aircraft to other similarly equipped aircraft and ground based Surveillance sensor systems. The Federal Aviation Administration (FAA) plans to deploy the ADS-B capabilities in 4 Segments the following are the activities for this segment: Segment 2 (2010 - 2014): - ADS-B "Out" Final Rule Published: FY 2010 - Continue Initial Aircraft to Aircraft Application Deployment: FY 2010 - FY 2014 - Additional Aircraft to Aircraft Application Deployment: FY 2010 - FY 2014 - Additional Aircraft to Aircraft Requirements Definition: FY 2010 - FY 2014 - Complete Traffic Information Service-Broadcast (TIS-B) / Flight Information Service-Broadcast (FIS-B) Deployment: FY 2012 Â¢Â□ Â" Complete Automatic Dependent Surveillance-Broadcast (ADS-B) National Airspace System (NAS) Wide Infrastructure Deployment: FY 2013 - Complete 40% Avionics: FY 2014

      SOPR: FAA   ***Primary Supported OIs:*** OI-0362

      SOCR: ***Primary Supported Enablers:*** EN-1501, EN-1503, EN-1506

Enabler Group: Cooperative Surveillance Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1500: Cooperative Surveillance - ADS-B Out Level 2							**E** 2014											
EN-1023: Cooperative Surveillance - ADS-B Out Level 1			**E** 2010															
PI-0014: Aircraft Equipage Implementation Policy		**P** 2009																

EN-1501   Cooperative Surveillance - ADS-B Out Level 3

Description: The Automatic Dependent Surveillance-Broadcast (ADS-B) cooperative system provides surveillance and situational awareness simultaneously to pilots and Air Traffic Control (ATC) facilities. This Global Positioning System (GPS)-based system enables aircraft equipment to determine an aircraft's multidimensional position within airspace or on the surface of an airport. This data is then transmitted by the aircraft to other similarly equipped aircraft and ground based Surveillance sensor systems. The Federal Aviation Administration (FAA) plans to deploy the ADS-B capabilities in 4 Segments, the following are the activities for this segment: Segment 3 (2015 – 2020): – Additional Aircraft to Aircraft Requirements Definition: FY 2015 – FY 2020 – Additional Aircraft to Aircraft Application Deployment: FY 2015 – FY 2020 – Targeted Removal of Legacy Surveillance: FY 2018 – FY 2020 – Complete 100% Avionics: FY 2020 – Complete Initial Aircraft to Aircraft Application Deployment: FY 2020

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-1502, EN-1504, EN-1507

Enabler Group: Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1501: Cooperative Surveillance - ADS-B Out Level 3													**E** 2020					
EN-1500: Cooperative Surveillance - ADS-B Out Level 2							**E** 2014											
PI-0075: PNT Services - Global Harmonization						**P** 2013												

EN-1502   Cooperative Surveillance - ADS-B Out Level 4

Description: The Automatic Dependent Surveillance-Broadcast (ADS-B) cooperative system provides surveillance and situational awareness simultaneously to pilots and Air Traffic Control (ATC) facilities. This Global Positioning System (GPS)-based system enables aircraft equipment to determine an aircraft's multidimensional position within airspace or on the surface of an airport. This data is then transmitted by the aircraft to other similarly equipped aircraft and ground based Surveillance sensor systems. The Federal Aviation Administration (FAA) plans to deploy the ADS-B capabilities in 4 Segments, the following are the activities for this segment: Segment 4 (2021 - 2025): - Complete Removal of Targeted Legacy Surveillance: FY 2023 - TIS-B Removal: FY 2025 - Complete Additional Aircraft to Aircraft Application Deployment: FY 2025

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-1508

Enabler Group: Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1502: Cooperative Surveillance - ADS-B Out Level 4																	2025	**E**
EN-1501: Cooperative Surveillance - ADS-B Out Level 3													**E** 2020					

EN-1503   Cooperative Surveillance - ADS-B IN/TIS-B/FIS-B Level 2

Description: The Automatic Dependent Surveillance - Broadcast (ADS-B) IN capability enables aircraft to receive Flight Information Service-Broadcast (FIS-B) and Traffic Information Service-Broadcast (TIS-B) from the ADS-B OUT service. It provides properly equipped aircraft (ADS-B IN) access to cooperative surveillance information from all aircraft in vicinity airspace to support traffic situation awareness and performance-based operations such as delegated separation for pair-wise maneuvers and paired approaches, and operation in self-separation airspace. Segment 2 (2010 – 2014): – Continue Initial Aircraft to Aircraft Application Deployment: FY 2010 – FY 2014 – Additional Aircraft to Aircraft Application Deployment: FY 2010 – FY 2014 – Additional Aircraft to Aircraft Requirements Definition: FY 2010 – FY 2014 – Complete 40% Avionics: FY 2014

> *SOPR:* Industry   *Primary Supported OIs:* OI-0334
>
> *SOCR:*   *Primary Supported Enablers:* EN-1504, EN-1506

Enabler Group: Cooperative Surveillance Enablers

Enabler Listing

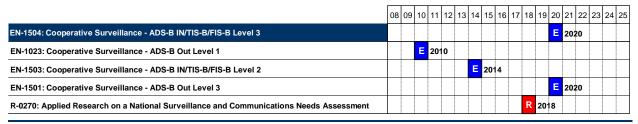|	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1503: Cooperative Surveillance - ADS-B IN/TIS-B/FIS-B Level 2							E 2014											
EN-1400: Cooperative Surveillance - ADS-B IN/TIS-B/FIS-B Level 1			E 2010															
EN-1500: Cooperative Surveillance - ADS-B Out Level 2							E 2014											
R-0790: Applied Research for a National Surveillance Architecture					R 2012													

EN-1504   Cooperative Surveillance - ADS-B IN/TIS-B/FIS-B Level 3

Description: The Automatic Dependent Surveillance - Broadcast (ADS-B) IN capability enables aircraft to receive Flight Information Service-Broadcast (FIS-B) and Traffic Information Service-Broadcast (TIS-B) from the ADS-B OUT service. It provides properly equipped aircraft (ADS-B IN) access to cooperative surveillance information from all aircraft in vicinity airspace to support traffic situation awareness and performance-based operations such as delegated separation for pair-wise maneuvers and paired approaches, and operation in self-separation airspace. Segment 3 (2015 – 2020): – Additional Aircraft to Aircraft Requirements Definition: FY 2015 – FY 2020 – Additional Aircraft to Aircraft Application Deployment: FY 2015 – FY 2020 – Complete 100% Avionics: FY 2020 – Complete Initial Aircraft to Aircraft Application Deployment: FY 2020

    SOPR: Industry   *Primary Supported OIs:* OI-0362

    SOCR: *Primary Supported Enablers:*

Enabler Group: Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1504: Cooperative Surveillance - ADS-B IN/TIS-B/FIS-B Level 3													E 2020					
EN-1023: Cooperative Surveillance - ADS-B Out Level 1			E 2010															
EN-1503: Cooperative Surveillance - ADS-B IN/TIS-B/FIS-B Level 2							E 2014											
EN-1501: Cooperative Surveillance - ADS-B Out Level 3													E 2020					
R-0270: Applied Research on a National Surveillance and Communications Needs Assessment											R 2018							

EN-1506   Integrated Cooperative Surveillance Information - Level 2

Description: Provides the integrated cooperative position reports produced by self reporting aircraft and Ground Support Equipment (GSE), and ground based Surveillance systems which provide multidimensional position reports. These position reports will be in an interoperable geodetic format. These position reports form the integrated Cooperative Surveillance Information Service, and based on access protocols are provided to aircraft operators, Air Navigation Service Providers (ANSP), Defense and Security providers for integration into their visual display systems.   The integrated surveillance data will be published for various users like aircraft operators, ANSP, airport operators, Airports Security operators, etc. over the Net-Centric Infrastructure (NCI). The NCI will provide the mechanism for conveyance, information assurance, access, and management. The Level 2 Initial Operational Capabilities (IOC) enhances Level 1 by including Multilateration-based Precision Runway Monitoring (PRM) and Wide-Area Surveillance, and ADS-B Segment 2 service enhancements for user publication.

    SOPR: FAA   *Primary Supported OIs:* OI-0327

    SOCR: *Primary Supported Enablers:* EN-0017, EN-0037, EN-1507, EN-1510

Enabler Group: Cooperative Surveillance Enablers

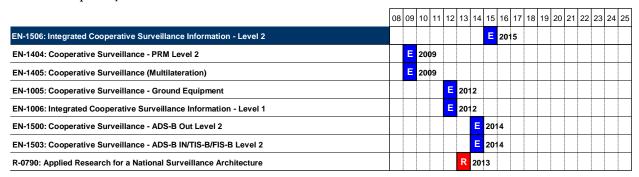|	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1506: Integrated Cooperative Surveillance Information - Level 2								E 2015										
EN-1404: Cooperative Surveillance - PRM Level 2		E 2009																
EN-1405: Cooperative Surveillance (Multilateration)		E 2009																
EN-1005: Cooperative Surveillance - Ground Equipment					E 2012													
EN-1006: Integrated Cooperative Surveillance Information - Level 1					E 2012													
EN-1500: Cooperative Surveillance - ADS-B Out Level 2							E 2014											
EN-1503: Cooperative Surveillance - ADS-B IN/TIS-B/FIS-B Level 2							E 2014											
R-0790: Applied Research for a National Surveillance Architecture						R 2013												

Enabler Listing

EN-1507   Integrated Cooperative Surveillance Information - Level 3

Description: Provides the integrated cooperative position reports produced by self reporting aircraft and Ground Support Equipment (GSE), and ground based Surveillance systems which provide multidimensional position reports. These position reports will be in an interoperable geodetic format. These position reports form the integrated Cooperative Surveillance Information Service, and based on access protocols are provided to aircraft operators, Automatic Navigation Service Provider (ANSP), Defense and Security providers for integration into their visual display systems.   The integrated surveillance data will be published for various users like aircraft operators, ANSP, airport operators, Airports Security operators, etc. over the Net-Centric Infrastructure (NCI). The NCI will provide the mechanism for conveyance, information assurance, access, and management. The Level 3 Initial Operational Capabilities (IOC) enhances Level 2 by including Automatic Dependent Surveillance-Broadcast (ADS-B) Segment 3 enhancements for user publication.

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-0018, EN-1508, EN-1511

Enabler Group: Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1507: Integrated Cooperative Surveillance Information - Level 3													E	2020				
EN-1506: Integrated Cooperative Surveillance Information - Level 2								E	2015									
EN-1501: Cooperative Surveillance - ADS-B Out Level 3													E	2020				

EN-1508   Integrated Cooperative Surveillance Information - Level 4

Description: Provides the integrated cooperative position reports produced by self reporting aircraft and Ground Support Equipment (GSE), and ground based Surveillance systems which provide multidimensional position reports. These position reports will be in an interoperable geodetic format. These position reports form the integrated Cooperative Surveillance Information Service, and based on access protocols are provided to aircraft operators, Air Navigation Service Providers (ANSP), Defense and Security providers for integration into their visual display systems.   The integrated surveillance data will be published for various users like aircraft operators, ANSP, airport operators, Airports Security operators, etc. over the Net-Centric Infrastructure (NCI). The NCI will provide the mechanism for conveyance, information assurance, access, and management. The Level 4 Initial Operational Capabilities (IOC) enhances Level 3 by including Automatic Dependent Surveillance-Broadcast (ADS-B) Segment 4 service enhancements for user publication.

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-1512

Enabler Group: Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1508: Integrated Cooperative Surveillance Information - Level 4																	2025	E
EN-1507: Integrated Cooperative Surveillance Information - Level 3													E	2020				
EN-1502: Cooperative Surveillance - ADS-B Out Level 4																	2025	E

Enabler Listing

EN-1510   Integrated Surveillance Information Service Level 2

Description: This Enterprise Service provides the fused position reports on (and tracks the movement of) aircraft, other aerial vehicles, and Ground Support Equipment (GSE) by integrating the Cooperative and Non-cooperative surveillance systems. These position reports will be in an interoperable geospatial format and time tagged. These position reports will enable various users like aircraft operators, Air Navigation Service Provider (ANSP), airport operators, Defense and Security providers, etc to produce an integrated air surveillance picture for their specific mission needs. Additionally these position reports could be used with developed flight algorithms to predict possible safety incursions. By linking these reports with other flight plan data, the resulting Flight Object will enable performance-based services and data sharing between aircraft operators, ANSPs, Flight Operations Centers (FOC) to enable Collaborative Decision-Making (CDM) where applicable. The preferred source of the position reports is the Cooperative self-reporting air and ground vehicles. If and when the Cooperative surveillance dissemination fails, the Non-cooperative surveillance information is used when available. The Integrated Surveillance Information Service provides the precise positional information required for Trajectory Based Operations (TBO) envisioned within NextGen. This is accomplished by providing accurate Position (Latitude, Longitude, and Altitude), Timing (Direction & Speed), and Intent (Anticipated changes in direction & speed). In addition, provide surveillance information "tagged" with quality attributes; Accuracy, Age (timeliness), Reliability, and Sensor source and accuracy information available based on eligibility. Furthermore, the service provides the ability to produce a timely "on-demand" air-picture appropriate to needs of user and system. The Level 2 Initial Operational Capabilities (IOC) provides the enhancements necessary to support Level 2 services. These services include the Level 1 Systems and ADS-B Segment 2.

SOPR: DOD-FAA		*Primary Supported OIs:* OI-4204	
SOCR:		*Primary Supported Enablers:* EN-0026, EN-1511	

Enabler Group: Integrated Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1510: Integrated Surveillance Information Service Level 2								E 2015										
EN-1049: Integrated Surveillance Information Service Level 1					E 2012													
EN-1506: Integrated Cooperative Surveillance Information - Level 2								E 2015										
D-2143: National Surveillance Architecture						D 2013												
PI-0009: National Integrated Surveillance Plan	P 2008																	
PI-0120: PNT Performance Requirements	P 2008																	

EN-1511   Integrated Surveillance Information Service Level 3

Description: This Enterprise Service provides the fused position reports on (and tracks the movement of) aircraft, other aerial vehicles, and Ground Support Equipment (GSE) by integrating the Cooperative and Non-cooperative surveillance systems. These position reports will be in an interoperable geospatial format and time tagged. These position reports will enable various users like aircraft operators, ANSP, airport operators, Defense and Security providers, etc to produce an integrated air surveillance picture for their specific mission needs. Additionally these position reports could be used with developed flight algorithms to predict possible safety incursions. By linking these reports with other flight plan data, the resulting Flight Object will enable performance-based services and data sharing between aircraft operators, ANSPs, Flight Operations Centers (FOC) to enable Collaborative Decision-Making (CDM) where applicable. The preferred source of the position reports is the Cooperative self-reporting air and ground vehicles. If and when the Cooperative surveillance dissemination fails, the Non-cooperative surveillance information is used when available. The Integrated Surveillance Information Service provides the precise positional information required for trajectory based operations envisioned within NextGen. This is accomplished by providing accurate Position (Latitude, Longitude, and Altitude), Timing (Direction & Speed), and Intent (Anticipated changes in direction & speed). In addition, provide surveillance information tagged with quality attributes; Accuracy, Age (timeliness), Reliability, and Sensor source and accuracy information available based on eligibility. Furthermore, the service provides the ability to produce a timely "on-demand" air-picture appropriate to needs of user and system. The Level 3 Initial Operational Capabilities (IOC) provides the enhancements necessary to support Level 3 services. These services include the Level 2 Systems and ADS-B.

SOPR: DOD-FAA		*Primary Supported OIs:* OI-4502, OI-4512, OI-4521	
SOCR:		*Primary Supported Enablers:* EN-1512, EN-4522	

Enabler Group: Integrated Surveillance Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1511: Integrated Surveillance Information Service Level 3													E 2020					
EN-1510: Integrated Surveillance Information Service Level 2								E 2015										
EN-1507: Integrated Cooperative Surveillance Information - Level 3													E 2020					
D-2143: National Surveillance Architecture											D 2018							

EN-1512   Integrated Surveillance Information Service Level 4

Description: This Enterprise Service provides the fused position reports on (and tracks the movement of) aircraft, other aerial vehicles, and Ground Support Equipment (GSE) by integrating the Cooperative and Non-cooperative surveillance systems. These position reports will be in an interoperable geospatial format and time tagged. These position reports will enable various users like aircraft operators, ANSP, airport operators, Defense and Security providers, etc to produce an integrated air surveillance picture for their specific mission needs. Additionally these position reports could be used with developed flight algorithms to predict possible safety incursions. By linking these reports with other flight plan data, the resulting Flight Object will enable performance-based services and data sharing between aircraft operators, Air Navigation Service Provider's (ANSPs), Flight Operations Centers (FOC) to enable Collaborative Decision-Making (CDM) where applicable. The preferred source of the position reports is the Cooperative self-reporting air and ground vehicles. If and when the Cooperative surveillance dissemination fails, the Non-cooperative surveillance information is used when available. The Integrated Surveillance Information Service provides the precise positional information required for trajectory based operations envisioned within NextGen. This is accomplished by providing accurate Position (Latitude, Longitude, and Altitude), Timing (Direction & Speed), and Intent (Anticipated changes in direction & speed). In addition, provide surveillance information "tagged" with quality attributes; Accuracy, Age (timeliness), Reliability, and Sensor source and accuracy information available based on eligibility. Furthermore, the service provides the ability to produce a timely "on-demand" air-picture appropriate to needs of user and system. The Level 4 Initial Availability provides the enhancements necessary to support Level 4 services. These services include the Level 3 Systems and Automatic Dependent Surveillance-Broadcast (ADS-B) Segment 4.

> *SOPR:* DOD-FAA   *Primary Supported OIs:* OI-0340
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Integrated Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1512: Integrated Surveillance Information Service Level 4																	2025	E
EN-1511: Integrated Surveillance Information Service Level 3													E 2020					
EN-1508: Integrated Cooperative Surveillance Information - Level 4																	2025	E

EN-1700   Cooperative Surveillance - ADS-C

Description: Automatic Dependent Surveillance-Contract (ADS-C) enables appropriately equipped aircraft to send position information messages at predetermined geographical locations, at specified time intervals, or at the occurrence of specified events. ADS-C can be relayed via Satellite Communication (SATCOM) data link, or Very High Frequency (VHF) data link ADS-C supports pair-wise maneuvers that reduce horizontal and longitudinal spacing to 30 nm between capable aircraft to increase capacity and improve operational flexibility. Currently, ADS-C has been certified for Federal Aviation Administration (FAA) Air Traffic Control (ATC) services in Pacific oceanic airspace. By 2020 the FAA will have deployed Automatic Dependent Surveillance-Broadcast (ADS-B) National Airspace System (NAS)-wide including Aircraft equipage, prior to that point a decision to continue ADS-C systems needs to be made.

> *SOPR:* FAA   *Primary Supported OIs:* OI-0344
>
> *SOCR:*   *Primary Supported Enablers:* EN-0106

Enabler Group: Cooperative Surveillance Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1700: Cooperative Surveillance - ADS-C	E 2008																	

Enabler Listing

EN-1750   Radio Data Link: Legacy Satcom

Description: Existing space-based data link support flight operations in some parts of the National Airspace System (NAS) (particularly oceanic). This data link technology is important to current and future data transfers between pilots, controllers, and automation systems.

    SOPR: FAA   *Primary Supported OIs:* OI-0344, OI-0353, OI-0354

    SOCR: *Primary Supported Enablers:* EN-0168, EN-0169

Enabler Group: Radio-Based Communications Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-1750: Radio Data Link: Legacy Satcom	E 2008																	

EN-2010   NextGen 4D Weather Cube Information - Level 1 Initial Operating Capability

Description: Weather analyses, diagnoses and forecasts are fused for the first time as a single authoritative source of weather information that is available to all users over a network-enabled infrastructure. Weather information for this level will include at a minimum winter weather, convection, icing, turbulence, and restrictions to vision. This enabler includes development of capabilities to process weather observations and multiple forecast capabilities into a single, authoritative, Four-Dimensional (4D) weather source available across varied space and time scales.

    SOPR: DOC   *Primary Supported OIs:* OI-0303, OI-0306, OI-0307, OI-0327, OI-0329, OI-0331, OI-0337, OI-0351, OI-0355, OI-0381, OI-0408, OI-0409, OI-0410, OI-2020, OI-4203, OI-4204

    SOCR: *Primary Supported Enablers:* EN-0003, EN-0006, EN-0026, EN-0027, EN-0029, EN-0030, EN-0033, EN-0034, EN-0035, EN-0207, EN-2020, EN-2070, EN-2411, EN-2421, EN-2431, EN-2441, EN-2451, EN-2461, EN-2471, EN-2481, EN-2501, EN-3120, EN-3121, EN-3123, EN-3127, EN-3132, EN-5004, EN-5009, EN-5010, EN-5011, EN-5017, EN-5022, EN-5052

Enabler Group: Weather Information and Dissemination Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-2700: Weather Information Regulatory Structure		E 2009																
EN-2050: Information Sharing Standards: Weather Information			E 2010															
EN-2080: Network-Enabled User-Defined Weather Information Request Function			E 2010															
EN-1234: NextGen Enterprise Network - DOC				E 2011														
EN-1273: NextGen Weather Information Services - FAA Group 1				E 2011														
EN-2260: Network-Enabled Weather Observation System - Integrated Level 1					E 2012													
EN-2410: Weather Forecasts - Consolidated Convective Storm - Level 1					E 2012													
EN-2420: Weather Forecasts - Consolidated Icing - Level 1					E 2012													
EN-2430: Weather Forecasts - Consolidated Turbulence - Level 1					E 2012													
EN-2440: Weather Forecasts - Consolidated Ceiling and Visibility - Level 1					E 2012													
EN-2470: Weather Information - Wake Vortex - Level 1					E 2012													
EN-2520: Weather Forecasts - Consolidated Winter Storm - Level 1					E 2012													
EN-2060: Legacy Weather Applications Integrated with Network-enabled Weather Information						E 2013												
D-0840: Weather Forecast Assessment Verification System				D 2011														
D-0850: Network-Enabled Weather Information System				D 2011														
PI-0087: Weather Information Policy - Use of Single Authoritative Source in ATM Decisions		P 2009																
PI-0089: Weather Avoidance Decision Making				P 2011														
PI-0086: Weather Information Policy - Global Harmonization					P 2012													

Enabler Listing

EN-2020   NextGen 4D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts

Description: A full up Four-Dimensional virtual weather information database will provide common weather information to all users. There will be better information with less ambiguity. The enabler builds on EN-2010 adding optimized and adaptively-controlled sources of weather observation data integrated and consolidated into a single authoritative source of near real-time diagnostic weather information available to all users over a Network-Enabled Infrastructure (NEI). This information will enable enhanced avoidance of weather hazards resulting in improved safety. Weather information will include all aviation-related weather diagnostics and forecasts, expanding upon the set provided in the first level, and will significantly increase weather forecast utility. This will also add a "discovery" process by which automated decision tools will be able to request and receive tailored weather information from the net-centric 4D weather cube with improved responsiveness to unplanned needs and unanticipated contingencies.

SOPR: DOC   *Primary Supported OIs:* OI-0317, OI-0339, OI-0402, OI-0403, OI-0406, OI-2021

SOCR: *Primary Supported Enablers:* EN-0036, EN-0037, EN-0038, EN-2030, EN-2412, EN-2422, EN-2432, EN-2442, EN-2452, EN-2462, EN-2472, EN-2482, EN-5209, EN-5210, EN-5211, EN-5217

Enabler Group: Weather Information and Dissemination Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E	2018						
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E	2013											
EN-2261: Network-Enabled Weather Observation System - Integrated Level 2									E	2016								
EN-2411: Weather Forecasts - Consolidated Convective Storm - Level 2									E	2016								
EN-2421: Weather Forecasts - Consolidated Icing - Level 2									E	2016								
EN-2431: Weather Forecasts - Consolidated Turbulence - Level 2									E	2016								
EN-2441: Weather Forecasts - Consolidated Ceiling and Visibility - Level 2									E	2016								
EN-2451: Weather Forecasts - Volcanic Ash - Level 2									E	2016								
EN-2461: Weather Forecasts - Environment - Level 2									E	2016								
EN-2471: Weather Information - Wake Vortex - Level 2									E	2016								
EN-2481: Weather Forecasts - Space - Level 2									E	2016								
EN-2521: Weather Forecasts - Consolidated Winter Storm - Level 2									E	2016								
EN-1063: Mobile Data Communications Management Applications - Level 2										E	2017							
D-0840: Weather Forecast Assessment Verification System									D	2016								
D-0850: Network-Enabled Weather Information System									D	2016								

EN-2030   NextGen 4D Weather Cube Information - Level 3 Full NextGen

Description: This enabler builds on EN-2020, meets all NextGen needs for weather information, and further increases forecast skill. Weather will become less visible, as decision tools can integrate weather into their algorithms and present human decision-makers with recommendations for which the impacts of weather hazards have already been mitigated. This information will enable enhanced avoidance of weather hazards resulting in improved safety.

SOPR: DOC   *Primary Supported OIs:* OI-0340, OI-0365, OI-0366, OI-0368, OI-2022, OI-5008

SOCR: *Primary Supported Enablers:* EN-3125, EN-3128, EN-3133

Enabler Group: Weather Information and Dissemination Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2030: NextGen 4-D Weather Cube Information - Level 3 Full NextGen															E 2022			
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E 2018							
EN-2070: Aircraft Systems - Aircraft-Aircraft Hazardous Weather Information Sharing												E 2019						
EN-2262: Network-Enabled Weather Observation System - Integrated Level 3													E 2020					
EN-2412: Weather Forecasts - Consolidated Convective Storm - Level 3													E 2020					
EN-2422: Weather Forecasts - Consolidated Icing - Level 3													E 2020					
EN-2432: Weather Forecasts - Consolidated Turbulence - Level 3													E 2020					
EN-2442: Weather Forecasts - Consolidated Ceiling and Visibility - Level 3													E 2020					
EN-2452: Weather Forecasts - Volcanic Ash - Level 3													E 2020					
EN-2462: Weather Forecasts - Environment - Level 3													E 2020					
EN-2472: Weather Information - Wake Vortex - Level 3													E 2020					
EN-2482: Weather Forecasts - Space - Level 3													E 2020					
EN-2522: Weather Forecasts - Consolidated Winter Storm - Level 3													E 2020					
D-0840: Weather Forecast Assessment Verification System													D 2020					
D-0850: Network-Enabled Weather Information System													D 2020					

EN-2040   NextGen Net-Enabled Virtual 4D Weather Cube Governance Structure

Description: A governance structure is established to manage the development, authorization, standards, policy, and certification of the NextGen Net-Enabled virtual Four Dimensional (4D) Weather Cube system to provide common, single authoritative sources of current and forecasted weather information.

> *SOPR:* DOC   *Primary Supported OIs:* OI-2010
>
> *SOCR:*   *Primary Supported Enablers:* EN-2050, EN-2700

Enabler Group: Governance and Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2040: NextGen Net-Enabled Virtual 4D Weather Cube Governance Structure		E 2009																
EN-2710: NextGen Net-Enabled Virtual Four-Dimensional (4D) Weather Cube Governance Model		E 2009																
PI-0088: Federal vs. Private Role In Weather Services		P 2009																

EN-2050   Information Sharing Standards: Weather Information

Description: The standards that allow weather data to be universally transported on a network-enabled infrastructure and used by a variety of automated support systems are developed and guide the implementation of the network-enabled capability. Weather data include the dissemination of consolidated observation and forecast data as well as the collection and control of sensor data.

> *SOPR:* DOC   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-1273, EN-2010, EN-2060, EN-2220, EN-2230, EN-2240

Enabler Group: Information Sharing Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2050: Information Sharing Standards: Weather Information			E 2010															
EN-2040: NextGen Net-Enabled Virtual 4D Weather Cube Governance Structure		E 2009																
EN-1230: Enterprise Networking Governance Structure			E 2010															
D-2117: Network-Enabled Weather Data Standards	D 2008																	
PI-0088: Federal vs. Private Role In Weather Services		P 2009																

Enabler Listing

EN-2060   Legacy Weather Applications Integrated with Network-enabled Weather Information

Description: Network-enable multi-agency legacy system functions (e.g., Federal Aviation Administration (FAA), Department of Defense (DOD)). Current point-to-point communications and unique processing of weather information (e.g., Weather and Radar Processor, Integrated Terminal Weather System) are network-enabled to support legacy display systems. Following this weather processor migration, Air Traffic Management (ATM) applications, procedures, and operational concepts are redirected to the NextGen Net-Enabled virtual Four-Dimensional (4D) Weather Cube. Stakeholders benefit from reduced cost to acquire weather information, a common weather picture, and access to the same weather information available to all stakeholders.

SOPR: FAA   *Primary Supported OIs:* OI-2010

SOCR: *Primary Supported Enablers:* EN-2010

Enabler Group: Weather Information and Dissemination Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2060: Legacy Weather Applications Integrated with Network-enabled Weather Information						E **2013**												
EN-2050: Information Sharing Standards: Weather Information			E **2010**															
EN-1273: NextGen Weather Information Services - FAA Group 1				E **2011**														
PI-0087: Weather Information Policy - Use of Single Authoritative Source in ATM Decisions	P **2009**																	

EN-2070   Aircraft Systems - Aircraft-Aircraft Hazardous Weather Information Sharing

Description: Hazardous weather information (e.g., turbulence, icing, low-level wind shear) collected by aircraft is transmitted directly to nearby aircraft, as well as to ground systems. The impact of sending this information directly to affected aircraft provides increased level of safety, while the same information transmitted to the ground systems is processed and used to provide observation and forecast information to all stakeholders. This enabler requires advanced air/air data communications that have yet to be defined.

SOPR: FAA   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2030

Enabler Group: Weather Information and Dissemination Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2070: Aircraft Systems - Aircraft-Aircraft Hazardous Weather Information Sharing												E **2019**						
EN-1201: Mobile Radio - Data Communications Level 1		E **2009**																
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E **2013**												
R-0860: Applied Research on Hazard Information Exchange using Aircraft Sensor Technology										R **2017**								
PI-0089: Weather Avoidance Decision Making				P **2011**														

EN-2080   Network-Enabled User-Defined Weather Information Request Function

Description: Enable user defined requests (i.e., querying) for weather information (e.g., weather along flight path) tailored to the operational need. Users obtain the specific information they require, rather than being provided volumes of information from which they need to locate and interpret the information they require.

SOPR: DOC   *Primary Supported OIs:* OI-2010

SOCR: *Primary Supported Enablers:* EN-2010

Enabler Group: Weather Information and Dissemination Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2080: Network-Enabled User-Defined Weather Information Request Function			E **2010**															
PI-0087: Weather Information Policy - Use of Single Authoritative Source in ATM Decisions	P **2009**																	

Enabler Listing

EN-2210   Network-Enabled Weather Observation Strategy

Description: Develop an overall strategy and implementation plan to define the capabilities of an adaptive, integrated network of ground, air and satellite weather sensors. This includes the research and acquisition strategy needed to support the plan. This plan will result in the elimination of independent and redundant plans, strategies, and acquisitions.

      SOPR: DOC   *Primary Supported OIs:*

      SOCR: *Primary Supported Enablers:* EN-2270

Enabler Group: Weather Observation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2210: Network-Enabled Weather Observation Strategy		E 2009																

EN-2220   Network-Enabled Weather Observation System - Ground-Based Level 1

Description: Network-enabled ground-based sensor system level 1. This initial observation sensor system includes connectivity to the net-centric environment (i.e., hardware, software and interfaces) and supports the collection of ground-based observations.

      SOPR: FAA   *Primary Supported OIs:*

      SOCR: *Primary Supported Enablers:* EN-2221, EN-2250, EN-2260, EN-5047

Enabler Group: Weather Observation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2220: Network-Enabled Weather Observation System - Ground-Based Level 1					E 2012													
EN-2050: Information Sharing Standards: Weather Information			E 2010															
EN-2270: Integrated Observation Governance Structure			E 2010															
EN-1234: NextGen Enterprise Network - DOC				E 2011														
D-2179: Enhanced Ground-Based Weather Sensors			D 2010															

EN-2221   Network-Enabled Weather Observation System - Ground-Based Level 2

Description: Network-enabled ground-based sensor system level 2. This intermediate observation sensor system includes connectivity to the net-centric environment (i.e., hardware, software and interfaces) and supports the collection of ground-based observations and provides the link necessary to control/configure sensors (e.g., scan rates of weather radars) to more efficiently meet NextGen needs for weather observations. This enabler adds additional sensors to the weather observation network beyond those used in Level 1.

      SOPR: FAA   *Primary Supported OIs:*

      SOCR: *Primary Supported Enablers:* EN-2222, EN-2261

Enabler Group: Weather Observation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2221: Network-Enabled Weather Observation System - Ground-Based Level 2									E 2016									
EN-2220: Network-Enabled Weather Observation System - Ground-Based Level 1					E 2012													
EN-2250: Network-Enabled Weather Observation System - Adaptive Control								E 2015										
D-2179: Enhanced Ground-Based Weather Sensors							D 2014											

EN-2222   Network-Enabled Weather Observation System - Ground-Based Level 3

Description: Network-enabled ground-based sensor system level 3. This advanced observation sensor system includes connectivity to the net-centric environment (i.e., hardware, software and interfaces) and supports the collection of ground-based observations and provides the link necessary to control/configure sensors (e.g., scan rates of weather radars) to more efficiently meet NextGen needs for weather observations. This enabler adds additional sensors to the weather observation network beyond those used in Level 2.

      SOPR: FAA   *Primary Supported OIs:*

      SOCR: *Primary Supported Enablers:* EN-2262

Enabler Group: Weather Observation Enablers

Enabler Listing																		

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2222: Network-Enabled Weather Observation System - Ground-Based Level 3													E 2020					
EN-2221: Network-Enabled Weather Observation System - Ground-Based Level 2									E 2016									
D-2179: Enhanced Ground-Based Weather Sensors											D 2018							

EN-2230   Network-Enabled Weather Observation System - Airborne Level 1 - Major Carriers

Description: This initial sensor system builds upon current airborne sensor systems. It supports the collection of observations (e.g., turbulence, icing, winds, temperature, and water vapor) from major passenger, regional passenger, and package carriers. The data is network enabled by ground systems. Other airborne observations will be used if they are available in this timeframe.

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-2231, EN-2250, EN-2260

Enabler Group: Weather Observation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2230: Network-Enabled Weather Observation System - Airborne Level 1 - Major Carriers					E 2012													
EN-2050: Information Sharing Standards: Weather Information			E 2010															
EN-2270: Integrated Observation Governance Structure			E 2010															
EN-1234: NextGen Enterprise Network - DOC					E 2011													
D-2191: Enhanced Airborne-Based Weather Sensors			D 2010															
PI-0024: Secure Information Exchange	P 2008																	
PI-0086: Weather Information Policy - Global Harmonization					P 2012													

EN-2231   Network-Enabled Weather Observation System - Airborne Level 2 - High-End Aircraft

Description: This intermediate sensor system builds upon the initial airborne sensor system. It supports the collection of observations (e.g., turbulence, icing, winds, temperature, water vapor, volcanic ash, and solar radiation) from all major commercial carriers, high end general aviation, and very light jets. It provides the initial link necessary to control/configure some sensors (e.g., activate/deactivate automated pilot reports, turn on or configure individual aircraft weather sensors) to more efficiently meet NextGen needs for weather observations. Some of the data will be network enabled in the air and some of the data is network enabled by ground systems. Other airborne observations will be used if they are available in this timeframe.

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-2232, EN-2261

Enabler Group: Weather Observation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2231: Network-Enabled Weather Observation System - Airborne Level 2 - High-End Aircraft									E 2016									
EN-2230: Network-Enabled Weather Observation System - Airborne Level 1 - Major Carriers					E 2012													
EN-2250: Network-Enabled Weather Observation System - Adaptive Control								E 2015										
D-2191: Enhanced Airborne-Based Weather Sensors							D 2014											

EN-2232   Network-Enabled Weather Observation System - Airborne Level 3 - UAS

Description: This final observation sensor system adds unmanned aircraft systems to the mix of platforms. It provides the total link necessary to control/configure sensors (e.g., activate/deactivate automated pilot reports, turn on or configure individual aircraft weather sensors) to more efficiently meet NextGen needs for weather observations.

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-2262

Enabler Group: Weather Observation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2232: Network-Enabled Weather Observation System - Airborne Level 3 - UAS													E 2020					
EN-2231: Network-Enabled Weather Observation System - Airborne Level 2 - High-End Aircraft									E 2016									
D-2191: Enhanced Airborne-Based Weather Sensors											D 2018							

Enabler Listing

EN-2240   Network-Enabled Weather Observation System - Satellites Level 1

Description: Network-enabled space-based sensor system level 1. This near-term observation sensor system includes connectivity to the net-centric environment (i.e., hardware, software and interfaces) and supports the collection of space-based observations.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2241, EN-2250, EN-2260

Enabler Group: Weather Observation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2240: Network-Enabled Weather Observation System - Satellites Level 1					E 2012													
EN-2050: Information Sharing Standards: Weather Information			E 2010															
EN-2270: Integrated Observation Governance Structure			E 2010															
EN-1234: NextGen Enterprise Network - DOC				E 2011														
D-2193: Enhanced Space-Based Weather Sensors			D 2010															
PI-0024: Secure Information Exchange	P 2008																	
PI-0086: Weather Information Policy - Global Harmonization					P 2012													

EN-2241   Network-Enabled Weather Observation System - Satellites Level 2

Description: Network-enabled space-based sensor system level 2. This mid-term observation sensor system includes connectivity to the net-centric environment (i.e., hardware, software and interfaces) and supports the collection of space-based observations and provides the link necessary to control/configure sensors (e.g., satellite scan rates, measurement types) to more efficiently meet NextGen needs for weather observations. This enabler adds additional sensors to the weather observation network beyond those used in Level 1.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2242, EN-2261

Enabler Group: Weather Observation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2241: Network-Enabled Weather Observation System - Satellites Level 2									E 2016									
EN-2240: Network-Enabled Weather Observation System - Satellites Level 1					E 2012													
EN-2250: Network-Enabled Weather Observation System - Adaptive Control								E 2015										
D-2193: Enhanced Space-Based Weather Sensors							D 2014											

EN-2242   Network-Enabled Weather Observation System - Satellites Level 3

Description: Network-enabled space-based sensor system level 3. This far-term observation sensor system includes connectivity to the net-centric environment (i.e., hardware, software and interfaces) and supports the collection of space-based observations and provides the link necessary to control/configure sensors (e.g., satellite scan rates, measurement types) to more efficiently meet NextGen needs for weather observations. This enabler adds additional sensors to the weather observation network beyond those used in Level 2.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2262

Enabler Group: Weather Observation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2242: Network-Enabled Weather Observation System - Satellites Level 3													E 2020					
EN-2241: Network-Enabled Weather Observation System - Satellites Level 2									E 2016									
D-2193: Enhanced Space-Based Weather Sensors											D 2018							

Enabler Listing

EN-2250   Network-Enabled Weather Observation System - Adaptive Control

Description: Net-enabled adaptive control of ground, airborne and satellite weather observation sensors in real time (includes hardware, software and interfaces) is established to effectively meet NextGen needs for weather observations. This will allow the sensor sweep rates, power levels, etc. to be changed to collect raw information to improve the observation/forecast information placed in the NextGen Net-Enabled virtual Four-Dimensional (4D) Weather Cube.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2221, EN-2231, EN-2241

Enabler Group: Weather Observation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2250: Network-Enabled Weather Observation System - Adaptive Control								E 2015										
EN-1234: NextGen Enterprise Network - DOC				E 2011														
EN-2220: Network-Enabled Weather Observation System - Ground-Based Level 1					E 2012													
EN-2230: Network-Enabled Weather Observation System - Airborne Level 1 - Major Carriers					E 2012													
EN-2240: Network-Enabled Weather Observation System - Satellites Level 1					E 2012													
D-0320: Adaptive Weather Observation Capabilities						D 2013												

EN-2260   Network-Enabled Weather Observation System - Integrated Level 1

Description: Level 1 integration of ground, airborne and satellite weather observation information in real time (includes hardware, software and interfaces) enables the creation of the first level single authoritative source of current weather information.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2010, EN-2261

Enabler Group: Weather Observation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2260: Network-Enabled Weather Observation System - Integrated Level 1					E 2012													
EN-1234: NextGen Enterprise Network - DOC				E 2011														
EN-2220: Network-Enabled Weather Observation System - Ground-Based Level 1					E 2012													
EN-2230: Network-Enabled Weather Observation System - Airborne Level 1 - Major Carriers					E 2012													
EN-2240: Network-Enabled Weather Observation System - Satellites Level 1					E 2012													
PI-0024: Secure Information Exchange	P 2008																	
PI-0087: Weather Information Policy - Use of Single Authoritative Source in ATM Decisions		P 2009																
PI-0088: Federal vs. Private Role In Weather Services		P 2009																
PI-0086: Weather Information Policy - Global Harmonization					P 2012													

EN-2261   Network-Enabled Weather Observation System - Integrated Level 2

Description: Level 2 integration of ground, airborne and satellite weather observation information in real time (includes hardware, software and interfaces) enables the creation of a second level single authoritative source of current weather information.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2020, EN-2262

Enabler Group: Weather Observation Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2261: Network-Enabled Weather Observation System - Integrated Level 2									E	2016								
EN-2260: Network-Enabled Weather Observation System - Integrated Level 1					E	2012												
EN-2221: Network-Enabled Weather Observation System - Ground-Based Level 2									E	2016								
EN-2231: Network-Enabled Weather Observation System - Airborne Level 2 - High-End Aircraft									E	2016								
EN-2241: Network-Enabled Weather Observation System - Satellites Level 2									E	2016								

EN-2262   Network-Enabled Weather Observation System - Integrated Level 3

Description: Level 3 integration of ground, airborne and satellite weather observation information in real time (includes hardware, software and interfaces) enables the creation of the third level single authoritative source of current weather information.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2030

Enabler Group: Weather Observation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2262: Network-Enabled Weather Observation System - Integrated Level 3													E	2020				
EN-2261: Network-Enabled Weather Observation System - Integrated Level 2									E	2016								
EN-2222: Network-Enabled Weather Observation System - Ground-Based Level 3													E	2020				
EN-2232: Network-Enabled Weather Observation System - Airborne Level 3 - UAS													E	2020				
EN-2242: Network-Enabled Weather Observation System - Satellites Level 3													E	2020				

EN-2270   Integrated Observation Governance Structure

Description: An organizational structure is established to manage the development, authorization, standards, policy, and certification of the NextGen integrated adaptive observation system.

SOPR: DOC   *Primary Supported OIs:* OI-2010

SOCR: *Primary Supported Enablers:* EN-2220, EN-2230, EN-2240

Enabler Group: Weather Observation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2270: Integrated Observation Governance Structure			E	2010														
EN-2210: Network-Enabled Weather Observation Strategy		E	2009															
PI-0087: Weather Information Policy - Use of Single Authoritative Source in ATM Decisions		P	2009															
PI-0088: Federal vs. Private Role In Weather Services		P	2009															

EN-2410   Weather Forecasts - Consolidated Convective Storm - Level 1

Description: NextGen's initial predictive models and current weather observations are fused/blended to provide a consolidated convective storm diagnosis and forecast that is available to users over a network-enabled infrastructure. This capability will include forecasts for the Continental United States (CONUS) 0-4 hour timeframe.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2010, EN-2411

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2410: Weather Forecasts - Consolidated Convective Storm - Level 1					E	2012												
PI-0087: Weather Information Policy - Use of Single Authoritative Source in ATM Decisions		P	2009															

Enabler Listing

EN-2411   Weather Forecasts - Consolidated Convective Storm - Level 2

Description: NextGen's intermediate predictive models and current weather observations are fused/blended to provide a consolidated probabilistic (and deterministic, if required) convective storm diagnosis and forecast that is available to users over a network-enabled infrastructure. This intermediate capability builds upon the completed research and improved algorithms that were not available for the initial release. Forecast improvements will include use of improved models, increased resolution, higher refresh rates, and improved physics to meet user needs. This capability will include forecasts for the Continental United States (CONUS) and Alaska 0-6 hour timeframe.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2020, EN-2412

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2411: Weather Forecasts - Consolidated Convective Storm - Level 2									E 2016									
EN-2410: Weather Forecasts - Consolidated Convective Storm - Level 1					E 2012													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-2500: Improve Weather Models - Level 1						E 2013												

EN-2412   Weather Forecasts - Consolidated Convective Storm - Level 3

Description: NextGen's fully operational predictive models and current weather observations are fused/blended to provide a consolidated probabilistic (and deterministic, if required) convective storm diagnosis and forecast that is available to users over a network-enabled infrastructure. This final capability builds upon the completed research and improved algorithms that were not available for the intermediate release. Forecast improvements will include use of improved models, increased resolution, higher refresh rates, and improved physics to meet user needs. This capability will include the Continental United States (CONUS), Alaska, and Global forecasts for all timeframes required by users.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2030

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2412: Weather Forecasts - Consolidated Convective Storm - Level 3													E 2020					
EN-2411: Weather Forecasts - Consolidated Convective Storm - Level 2									E 2016									
EN-2501: Improve Weather Models - Level 2										E 2017								
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E 2018							

EN-2420   Weather Forecasts - Consolidated Icing - Level 1

Description: NextGen's initial predictive models and current weather observations are fused/blended to provide a consolidated icing diagnosis and forecast that is available to users over a Network-Enabled Infrastructure (NEI). This capability will include forecasts for the Continental United States (CONUS) 0-12 hour timeframe.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2010, EN-2421

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2420: Weather Forecasts - Consolidated Icing - Level 1					E 2012													
PI-0087: Weather Information Policy - Use of Single Authoritative Source in ATM Decisions		P 2009																

Enabler Listing

EN-2421 Weather Forecasts - Consolidated Icing - Level 2

Description: NextGen's intermediate predictive models and current weather observations are fused/blended to provide a consolidated probabilistic icing diagnosis and forecast that is available to users over a network-enabled infrastructure. This intermediate capability builds upon the completed research and improved algorithms that were not available for the initial release. Forecast improvements will include use of improved models, increased resolution, higher refresh rates, and improved physics to meet user needs. This capability will include CONUS and Alaska 0-12 hour timeframe.

SOPR: DOC	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-2020, EN-2422

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2421: Weather Forecasts - Consolidated Icing - Level 2									E 2016									
EN-2420: Weather Forecasts - Consolidated Icing - Level 1					E 2012													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-2500: Improve Weather Models - Level 1						E 2013												

EN-2422 Weather Forecasts - Consolidated Icing - Level 3

Description: NextGen's fully operational predictive models and current weather observations are fused/blended to provide a consolidated probabilistic icing diagnosis and forecast that is available to users over a network-enabled infrastructure. This final capability builds upon the completed research and improved algorithms that were not available for the intermediate release. Forecast improvements will include use of improved models, increased resolution, higher refresh rates, and improved physics to meet user needs. This capability will include the Continental United States (CONUS), Alaska, and Global forecasts for all timeframes required by users.

SOPR: DOC	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-2030

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2422: Weather Forecasts - Consolidated Icing - Level 3													E 2020					
EN-2421: Weather Forecasts - Consolidated Icing - Level 2									E 2016									
EN-2501: Improve Weather Models - Level 2										E 2017								
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E 2018							

EN-2430 Weather Forecasts - Consolidated Turbulence - Level 1

Description: NextGen's initial predictive models and current weather observations are fused/blended to provide a consolidated turbulence diagnosis and forecast that is available to users over a network-enabled infrastructure. This capability will include North America from 10,000 feet to FL450, 0-18 hours, updated hourly, and will forecast clear air and mountain wave turbulence.

SOPR: DOC	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-2010, EN-2431

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2430: Weather Forecasts - Consolidated Turbulence - Level 1					E 2012													
PI-0087: Weather Information Policy - Use of Single Authoritative Source in ATM Decisions		P 2009																

Enabler Listing

EN-2431   Weather Forecasts - Consolidated Turbulence - Level 2

Description: NextGen's intermediate predictive models and current weather observations are fused/blended to provide a consolidated probabilistic turbulence diagnosis and forecast that is available to users over a network-enabled infrastructure. This intermediate capability builds upon the completed research and improved algorithms that were not available for the initial release. Forecast improvements will include use of improved models, increased resolution, higher refresh rates, and improved physics to meet user needs. This capability will include 1) a North American diagnosis from 10,000 feet to FL 450 updated every 15 minutes, 2) a North American forecast from 10,000 feet to FL 450 for 0 to 18 hours, updated hourly, 3) a Regional forecast over the Northeast Corridor that includes convective turbulence, and 4) a Global forecast from 20,000 feet to FL 650 for 0 to 36 hours with a 6-hour update rate.

SOPR: DOC	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-2020, EN-2432

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2431: Weather Forecasts - Consolidated Turbulence - Level 2									E 2016									
EN-2430: Weather Forecasts - Consolidated Turbulence - Level 1					E 2012													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-2500: Improve Weather Models - Level 1						E 2013												

EN-2432   Weather Forecasts - Consolidated Turbulence - Level 3

Description: NextGen's fully operational predictive models and current weather observations are fused/blended to provide a consolidated probabilistic turbulence diagnosis and forecast that is available to users over a network-enabled infrastructure. This final capability builds upon the completed research and improved algorithms that were not available for the intermediate release. Forecast improvements will include use of improved models, increased resolution, higher refresh rates, and improved physics to meet user needs. This capability will include the Continental United States (CONUS), Alaska, and Global forecasts for all timeframes required by users.

SOPR: DOC	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-2030

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2432: Weather Forecasts - Consolidated Turbulence - Level 3													E 2020					
EN-2431: Weather Forecasts - Consolidated Turbulence - Level 2									E 2016									
EN-2501: Improve Weather Models - Level 2										E 2017								
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E 2018							

EN-2440   Weather Forecasts - Consolidated Ceiling and Visibility - Level 1

Description: NextGen's initial predictive models and current weather observations are fused/blended to provide a consolidated ceiling and visibility diagnosis and forecast that is available to users over a network-enabled infrastructure. This capability will include 1) Continental United States (CONUS) 0-12 hours, updated hourly (diagnosis every 5 minutes) and 2) a high-resolution product around selected terminal areas.

SOPR: DOC	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-2010, EN-2441

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2440: Weather Forecasts - Consolidated Ceiling and Visibility - Level 1					E 2012													
PI-0087: Weather Information Policy - Use of Single Authoritative Source in ATM Decisions		P 2009																

Enabler Listing

EN-2441 Weather Forecasts - Consolidated Ceiling and Visibility - Level 2

Description: NextGen's intermediate predictive models and current weather observations are fused/blended to provide a consolidated probabilistic ceiling and visibility diagnosis and forecast that is available to users over a network-enabled infrastructure. This intermediate capability builds upon the completed research and improved algorithms that were not available for the initial release. Forecast improvements will include use of improved models, increased resolution, higher refresh rates, and improved physics to meet user needs. This capability will add Alaska to the EN-2440 capability.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2020, EN-2442

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2441: Weather Forecasts - Consolidated Ceiling and Visibility - Level 2									E 2016									
EN-2440: Weather Forecasts - Consolidated Ceiling and Visibility - Level 1					E 2012													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-2500: Improve Weather Models - Level 1						E 2013												

EN-2442 Weather Forecasts - Consolidated Ceiling and Visibility - Level 3

Description: NextGen's fully operational predictive models and current weather observations are fused/blended to provide a consolidated probabilistic ceiling and visibility diagnosis and forecast that is available to users over a network-enabled infrastructure. This final capability builds upon the completed research and improved algorithms that were not available for the intermediate release. Forecast improvements will include use of improved models, increased resolution, higher refresh rates, and improved physics to meet user needs. This capability will include the Continental United States (CONUS), Alaska, and Global forecasts for all timeframes required by users.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2030

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2442: Weather Forecasts - Consolidated Ceiling and Visibility - Level 3													E 2020					
EN-2441: Weather Forecasts - Consolidated Ceiling and Visibility - Level 2									E 2016									
EN-2501: Improve Weather Models - Level 2										E 2017								
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E 2018							

EN-2451 Weather Forecasts - Volcanic Ash - Level 2

Description: NextGen's intermediate predictive models and current weather observations are fused/blended to provide a consolidated probabilistic volcanic ash forecast that is available to users over a network-enabled infrastructure. Predictive model improvements will include initial model improvements, increased forecast resolution, higher refresh rates, improved physics, etc. to meet user needs. Volcanic Ash, Environment, and Space information do not have level 1 enablers since digital, Four-Dimensional (4D) versions of this information will not be available by that timeframe.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2020, EN-2452

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2451: Weather Forecasts - Volcanic Ash - Level 2									E 2016									
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-2500: Improve Weather Models - Level 1						E 2013												

Enabler Listing

EN-2452   Weather Forecasts - Volcanic Ash - Level 3

Description: NextGen's fully operational predictive models and current weather observations are fused/blended to provide a consolidated probabilistic volcanic ash forecast that is available to users over a Network-Enabled Infrastructure (NEI). This final capability builds upon the completed research and improved algorithms that were not available for the intermediate release. Predictive model improvements will include initial model improvements, increased forecast resolution, higher refresh rates, improved physics, etc. to meet user needs. Volcanic Ash, Environment, and Space information do not have level 1 enablers since digital, Four-Dimensional (4D) versions of this information will not be available by that timeframe. This capability will include the Continental United States (CONUS), Alaska, and Global forecasts for all timeframes required by users.

SOPR: DOC *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2030

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2452: Weather Forecasts - Volcanic Ash - Level 3													E 2020					
EN-2451: Weather Forecasts - Volcanic Ash - Level 2									E 2016									
EN-2501: Improve Weather Models - Level 2										E 2017								
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E 2018							

EN-2461   Weather Forecasts - Environment - Level 2

Description: NextGen's intermediate predictive models and current weather observations are fused/blended to provide a consolidated probabilistic environmental forecast that is available to users over a Network-Enabled Infrastructure (NEI). This includes forecasts of noise propagation, dispersion of airborne pollutants (including from a terrorist attack or accidental release), and forecasts of the sensitivity of atmospheric volumes to exhaust emissions. Predictive model improvements will include initial model improvements, increased forecast resolution, higher refresh rates, improved physics, etc. to meet user needs. Volcanic Ash, Environment, and Space information do not have level 1 enablers since digital, 4D versions of this information will not be available by that timeframe.

SOPR: FAA *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2020, EN-2462

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2461: Weather Forecasts - Environment - Level 2									E 2016									
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-2500: Improve Weather Models - Level 1						E 2013												

EN-2462   Weather Forecasts - Environment - Level 3

Description: NextGen's fully operational predictive models and current weather observations are fused/blended to provide a consolidated probabilistic environmental forecast that is available to users over a Network-Enabled Infrastructure (NEI). This final capability builds upon the completed research and improved algorithms that were not available for the intermediate release. This includes forecasts of noise propagation, dispersion of airborne pollutants (including from a terrorist attack or accidental release), and forecasts of the sensitivity of atmospheric volumes to exhaust emissions. Predictive model improvements will include initial model improvements, increased forecast resolution, higher refresh rates, improved physics, etc. to meet user needs. Volcanic Ash, Environment, and Space information do not have level 1 enablers since digital, 4D versions of this information will not be available by that timeframe. This capability will include the Continental United States (CONUS), Alaska, and Global forecasts for all timeframes required by users.

SOPR: FAA *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2030

Enabler Group: Weather Forecasting Enablers

Enabler Listing																		

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2462: Weather Forecasts - Environment - Level 3													E 2020					
EN-2461: Weather Forecasts - Environment - Level 2									E 2016									
EN-2501: Improve Weather Models - Level 2										E 2017								
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E 2018							

EN-2470   Weather Information - Wake Vortex - Level 1

Description: NextGen's initial predictive models and current weather observations are fused to provide a consolidated data set for wake vortex advisory systems that is available over a Network-Enabled Infrastructure (NEI).

   SOPR: FAA   *Primary Supported OIs:* OI-0400, OI-0401
   SOCR: *Primary Supported Enablers:* EN-2010, EN-2471

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2470: Weather Information - Wake Vortex - Level 1					E 2012													
PI-0087: Weather Information Policy - Use of Single Authoritative Source in ATM Decisions		P 2009																

EN-2471   Weather Information - Wake Vortex - Level 2

Description: NextGen's intermediate predictive models and current weather observations are fused to provide a consolidated data set for wake vortex advisory systems that is available over a Network-Enabled Infrastructure. This intermediate capability builds upon the completed research and improved algorithms that were not available for the initial release. Predictive model improvements will include initial model improvements, increased forecast resolution, higher refresh rates, improved physics, etc. to meet user needs.

   SOPR: FAA   *Primary Supported OIs:*
   SOCR: *Primary Supported Enablers:* EN-2020, EN-2472

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2471: Weather Information - Wake Vortex - Level 2									E 2016									
EN-2470: Weather Information - Wake Vortex - Level 1					E 2012													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-2500: Improve Weather Models - Level 1						E 2013												

EN-2472   Weather Information - Wake Vortex - Level 3

Description: NextGen's fully operational predictive models and current weather observations are fused to provide a consolidated data set for wake vortex advisory systems that is available over a Network-Enabled Infrastructure. This final capability builds upon the completed research and improved algorithms that were not available for the intermediate release. Predictive model improvements will include initial model improvements, increased forecast resolution, higher refresh rates, improved physics, etc. to meet user needs. This capability will include the Continental United States (CONUS), Alaska, and Global forecasts for all timeframes required by users.

   SOPR: FAA   *Primary Supported OIs:*
   SOCR: *Primary Supported Enablers:* EN-2030

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2472: Weather Information - Wake Vortex - Level 3													E 2020					
EN-2471: Weather Information - Wake Vortex - Level 2									E 2016									
EN-2501: Improve Weather Models - Level 2										E 2017								
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E 2018							

Enabler Listing

EN-2481   Weather Forecasts - Space - Level 2

Description: NextGen's intermediate predictive models and current weather observations are fused/blended to provide a consolidated probabilistic space weather forecast that is available to users over a Network-Enabled Infrastructure (NEI). Predictive model improvements will include initial model improvements, increased forecast resolution, higher refresh rates, improved physics, etc. to meet user needs. Volcanic Ash, Environment, and Space information do not have level 1 enablers since digital, Four-Dimensional (4D) versions of this information will not be available by that timeframe.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2020, EN-2482

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2481: Weather Forecasts - Space - Level 2									E 2016									
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-2500: Improve Weather Models - Level 1						E 2013												

EN-2482   Weather Forecasts - Space - Level 3

Description: NextGen's fully operational predictive models and current weather observations are fused/blended to provide a consolidated probabilistic space weather forecast that is available to users over a Network-Enabled Infrastructure (NEI). This final capability builds upon the completed research and improved algorithms that were not available for the intermediate release. Predictive model improvements will include initial model improvements, increased forecast resolution, higher refresh rates, improved physics, etc. to meet user needs. Volcanic Ash, Environment, and Space information do not have level 1 enablers since digital, Four-Dimensional (4D) versions of this information will not be available by that timeframe. This capability will include the Continental United States (CONUS), Alaska, and Global forecasts for all timeframes required by users.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2030

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2482: Weather Forecasts - Space - Level 3													E 2020					
EN-2481: Weather Forecasts - Space - Level 2									E 2016									
EN-2501: Improve Weather Models - Level 2										E 2017								
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E 2018							

EN-2500   Improve Weather Models - Level 1

Description: Initial model improvements may include increased forecast resolution, higher refresh rates, improved physics, etc. to meet user needs. These model improvements enable diagnostics and forecasts of parameters such as convective weather, icing, turbulence, etc. designed to meet NextGen needs.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2411, EN-2421, EN-2431, EN-2441, EN-2451, EN-2461, EN-2471, EN-2481, EN-2501

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2500: Improve Weather Models - Level 1						E 2013												
R-2114: Applied Research on Improved Weather Sensing and Forecasting Models				R 2011														
D-2115: Initial Probabilistic Weather Forecasts				D 2011														
D-1530: Spatial Weather Prediction Models for the 4D Weather Cube				D 2011														

Enabler Listing

EN-2501   Improve Weather Models - Level 2

Description: Advanced model improvements may include increased forecast resolution, higher refresh rates, improved physics, etc. to meet user needs. These model improvements enable diagnostics and forecasts of parameters such as convective weather, icing, turbulence, etc. designed to meet NextGen needs.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2412, EN-2422, EN-2432, EN-2442, EN-2452, EN-2462, EN-2472, EN-2482

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2501: Improve Weather Models - Level 2										E	2017							
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E	2013											
EN-2500: Improve Weather Models - Level 1						E	2013											
R-2114: Applied Research on Improved Weather Sensing and Forecasting Models								R	2015									
D-2115: Initial Probabilistic Weather Forecasts								D	2015									

EN-2520   Weather Forecasts - Consolidated Winter Storm - Level 1

Description: NextGen's initial predictive models and current weather observations are fused/blended to provide a consolidated winter storm diagnosis and forecast that is available to users over a Network-Enabled Infrastructure (NEI). This capability will include forecasts for the Continental United States (CONUS) 0-4 hour timeframe.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2010, EN-2521

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2520: Weather Forecasts - Consolidated Winter Storm - Level 1					E	2012												

EN-2521   Weather Forecasts - Consolidated Winter Storm - Level 2

Description: NextGen's intermediate predictive models and current weather observations are fused/blended to provide a consolidated probabilistic (and deterministic, if required) winter storm diagnosis and forecast that is available to users over a Network-Enabled Infrastructure. This intermediate capability builds upon the completed research and improved algorithms that were not available for the initial release. Forecast improvements will include use of improved models, increased resolution, higher refresh rates, and improved physics to meet user needs. This capability will include forecasts for the Continental United States (CONUS) and Alaska 0-6 hour timeframe.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2020, EN-2522

Enabler Group: Weather Forecasting Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2521: Weather Forecasts - Consolidated Winter Storm - Level 2									E	2016								
EN-2520: Weather Forecasts - Consolidated Winter Storm - Level 1					E	2012												

EN-2522   Weather Forecasts - Consolidated Winter Storm - Level 3

Description: NextGen's fully operational predictive models and current weather observations are fused/blended to provide a consolidated probabilistic (and deterministic, if required) winter storm diagnosis and forecast that is available to users over a Network-Enabled Infrastructure (NEI). This final capability builds upon the completed research and improved algorithms that were not available for the intermediate release. Forecast improvements will include use of improved models, increased resolution, higher refresh rates, and improved physics to meet user needs. This capability will include the Continental United States (CONUS), Alaska, and Global forecasts for all timeframes required by users.

SOPR: DOC   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-2030

Enabler Group: Weather Forecasting Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2522: Weather Forecasts - Consolidated Winter Storm - Level 3													E	2020				
EN-2521: Weather Forecasts - Consolidated Winter Storm - Level 2									E	2016								

EN-2680   Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1

Description: This enabler provides guidance, methodologies, and algorithms for weather assimilation into decision-making. This is accomplished through initial, crosscutting, foundational research such as: translation of weather's impact on operations, operational metrics development, determination of NextGen relevant weather information, basic mathematical research into optimization methodologies, operational research analysis, techniques for the presentation of probabilistic information to humans and automation, characterization of hazardous weather phenomena (e.g., estimation of aircraft-specific weather hazard levels, pilot likelihood to deviate, permeability of weather), and benefits pool estimation. This near-term research will likely produce more immediately useable results for weather assimilation for the en route and terminal domains, because of the current maturity of research in en route weather conflict prediction and resolution; arrival/departure separation standards due to wake vortex turbulence; and ceiling and visibility impacts on airport arrival rates. Another reason these capabilities are anticipated in the near-term is that the look-ahead time for the required weather is relatively short, resulting in levels of weather uncertainty that can be more easily addressed. Some early, less sophisticated results in the assimilation of weather in the Traffic Flow Management (TFM) domain and surface operations may also be achieved.

SOPR: FAA

Primary Supported OIs: OI-0303, OI-0306, OI-0307, OI-0327, OI-0329, OI-0331, OI-0337, OI-0351, OI-0355, OI-0381, OI-0408, OI-0409, OI-0410, OI-4203, OI-4204

SOCR:

Primary Supported Enablers: EN-0003, EN-0006, EN-0026, EN-0027, EN-0029, EN-0030, EN-0033, EN-0034, EN-0035, EN-2681, EN-5004, EN-5009, EN-5010, EN-5011, EN-5017, EN-5022, EN-5052

Enabler Group: Weather Information and Dissemination Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E	2011													
R-2112: Applied Research on Weather Integration into NextGen Decision Making		R	2009															
D-2113: Operating Procedures for Human Forecasters using Automated Systems		D	2009															
D-1220: Development of Weather Hazard Severity Indices		D	2009															
PI-0089: Weather Avoidance Decision Making				P	2011													

EN-2681   Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 2

Description: This enabler provides guidance, methodologies, and algorithms for weather assimilation into decision-making. This is accomplished through intermediate, crosscutting, foundational research such as: translation of weather's impact on operations, operational metrics development, determination of NextGen relevant weather information, basic mathematical research into optimization methodologies, operational research analysis, techniques for the presentation of probabilistic information to humans and automation, characterization of hazardous weather phenomena (e.g., estimation of aircraft-specific weather hazard levels, pilot likelihood to deviate, permeability of weather), and benefits pool estimation. This mid-term research will work with greater levels of weather uncertainty and longer look ahead times. It will extend the results in the en route and terminal domains and begin to produce useable results for weather assimilation in the Traffic Flow Management (TFM) domain and surface operations arena. Areas of particular focus include: working with increasing maturity of probabilistic forecasting; methods to translate greater weather uncertainty levels into impact; and advances in risk based decision-making.

SOPR: FAA

Primary Supported OIs: OI-0317, OI-0339, OI-0402, OI-0403, OI-0406

SOCR:

Primary Supported Enablers: EN-0036, EN-0037, EN-0038, EN-2682, EN-5209, EN-5210, EN-5211, EN-5217

Enabler Group: Weather Information and Dissemination Enablers

Enabler Listing																		
	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2681: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 2										E 2017								
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
R-2112: Applied Research on Weather Integration into NextGen Decision Making								R 2015										
D-2113: Operating Procedures for Human Forecasters using Automated Systems								D 2015										
D-1220: Development of Weather Hazard Severity Indices								D 2015										

EN-2682   Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 3

Description: This enabler provides guidance, methodologies, and algorithms for weather assimilation into decision-making. This is accomplished through end state, crosscutting, foundational research such as: translation of weather's impact on operations, operational metrics development, determination of NextGen relevant weather information, basic mathematical research into optimization methodologies, operational research analysis, techniques for the presentation of probabilistic information to humans and automation, characterization of hazardous weather phenomena (e.g., estimation of aircraft-specific weather hazard levels, pilot likelihood to deviate, permeability of weather), and benefits pool estimation. This far-term research will expand upon the results in all domains in order to meet all NextGen goals for assimilation of weather into decision-making.

> *SOPR:* FAA   *Primary Supported OIs:* OI-0340, OI-0365, OI-0366, OI-0368, OI-5008
> *SOCR:*   *Primary Supported Enablers:* EN-3125

Enabler Group: Weather Information and Dissemination Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2682: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 3														E 2021				
EN-2681: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 2										E 2017								
R-2112: Applied Research on Weather Integration into NextGen Decision Making												R 2019						
D-2113: Operating Procedures for Human Forecasters using Automated Systems												D 2019						
D-1220: Development of Weather Hazard Severity Indices												D 2019						

EN-2700   Weather Information Regulatory Structure

Description: This new weather regulatory structure is necessary to accommodate NextGen weather capabilities and technological advancements. It will address numerous policy issues such as: How will weather information from the network-enabled data cube address today's regulatory requirements? How will information in the weather cube be certified for use?

> *SOPR:* FAA   *Primary Supported OIs:* OI-2010
> *SOCR:*   *Primary Supported Enablers:* EN-2010

Enabler Group: Governance and Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2700: Weather Information Regulatory Structure		E 2009																
EN-2040: NextGen Net-Enabled Virtual 4D Weather Cube Governance Structure		E 2009																
PI-0087: Weather Information Policy - Use of Single Authoritative Source in ATM Decisions		P 2009																
PI-0088: Federal vs. Private Role In Weather Services		P 2009																

EN-2710   NextGen Net-Enabled Virtual Four-Dimensional (4D) Weather Cube Governance Model

Description: This is the high-level Governance Model for all of aviation weather and includes: delineating the boundaries of private and public sector weather information; defining inter-agency weather roles and responsibilities; and arbitrating inter-agency financing of NextGen weather.

> *SOPR:* DOC   *Primary Supported OIs:* OI-2010
> *SOCR:*   *Primary Supported Enablers:* EN-2040

Enabler Group: Governance and Standards Enablers

Enabler Listing																		

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2710: NextGen Net-Enabled Virtual Four-Dimensional (4D) Weather Cube Governance Model		E 2009																
PI-0087: Weather Information Policy - Use of Single Authoritative Source in ATM Decisions		P 2009																
PI-0088: Federal vs. Private Role In Weather Services		P 2009																

EN-2810   Aircraft Systems - Turbulence Mitigation

Description: On board turbulence and gust alleviation systems allow aircraft to safely traverse greater intensities of adverse weather

SOPR: Industry   *Primary Supported OIs:* OI-3104

SOCR: *Primary Supported Enablers:* EN-3125

Enabler Group: Aircraft Weather-Related System Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2810: Aircraft Systems - Turbulence Mitigation											E 2018							
EN-2870: Aircraft Systems - Weather Mitigation Requirements											E 2018							

EN-2820   Aircraft Systems - Icing Alleviation

Description: Icing alleviation systems for (a) aircraft surfaces, (b) engines, and (c) airport surfaces increase system safety, efficiency and capacity

SOPR: Industry   *Primary Supported OIs:* OI-3104

SOCR: *Primary Supported Enablers:* EN-3128, EN-3133

Enabler Group: Aircraft Weather-Related System Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2820: Aircraft Systems - Icing Alleviation											E 2018							
EN-2870: Aircraft Systems - Weather Mitigation Requirements											E 2018							

EN-2830   Aircraft Systems - Low Visibility Alleviation

Description: Enhanced onboard vision systems allow the Visual Flight Rule (VFR)-style operations (both ground and in-flight operations) in low visibility conditions

SOPR: Industry   *Primary Supported OIs:* OI-3104

SOCR: *Primary Supported Enablers:* EN-3125

Enabler Group: Aircraft Weather-Related System Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2830: Aircraft Systems - Low Visibility Alleviation											E 2018							
EN-2870: Aircraft Systems - Weather Mitigation Requirements											E 2018							

EN-2840   Aircraft Systems - Vortex Avoidance Alleviation

Description: Onboard systems mitigate inadvertent wake vortex encounters and increase safety

SOPR: Industry   *Primary Supported OIs:* OI-3104

SOCR: *Primary Supported Enablers:*

Enabler Group: Aircraft Weather-Related System Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2840: Aircraft Systems - Vortex Avoidance Alleviation											E 2018							
EN-2870: Aircraft Systems - Weather Mitigation Requirements											E 2018							

Enabler Listing

EN-2850   Aircraft Systems - Radiation Alleviation

Description: Mitigation systems for electromagnetic radiation and charged particles ensure crew/passenger safety, as well as non-interference with navigation and communication systems.

    SOPR: Industry   *Primary Supported OIs:* OI-3104

    SOCR: *Primary Supported Enablers:* EN-3125

Enabler Group: Aircraft Weather-Related System Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2850: Aircraft Systems - Radiation Alleviation											E **2018**							
EN-2870: Aircraft Systems - Weather Mitigation Requirements											E **2018**							

EN-2860   Aircraft Systems - Volcanic Ash Alleviation

Description: On board sensors and protection systems that improve the ability of the aircraft to avoid, exit, or endure atmospheric particulates.

    SOPR: Industry   *Primary Supported OIs:* OI-3104

    SOCR: *Primary Supported Enablers:* EN-3125

Enabler Group: Aircraft Weather-Related System Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2860: Aircraft Systems - Volcanic Ash Alleviation											E **2018**							
EN-2870: Aircraft Systems - Weather Mitigation Requirements											E **2018**							

EN-2870   Aircraft Systems - Weather Mitigation Requirements

Description: Develop requirements for reduced weather impact from aircraft systems, perform cost/benefits studies, and develop a strategy.

    SOPR: Industry   *Primary Supported OIs:* OI-3104

    SOCR: *Primary Supported Enablers:* EN-2810, EN-2820, EN-2830, EN-2840, EN-2850, EN-2860, EN-3125

Enabler Group: Aircraft Weather-Related System Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-2870: Aircraft Systems - Weather Mitigation Requirements											E **2018**							
D-2123: Aircraft Systems Weather Mitigation Requirements									D **2016**									

Enabler Listing

EN-3016   Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 1

Description: Aviation Safety Information Sharing Environment (ASIAS) Level 1 enables the Safety Assurance and Safety Risk Management business processes for a Safety Management System (SMS). ASIAS Level 1 expands current aviation safety information sharing capabilities to include new system and analysis capabilities. Enhanced system capabilities include the integration of disparate, publicly available safety information with proprietary information from the commercial aviation industry that is voluntarily provided. The types of information to be integrated include: incident and accident data; operational data (exposure); experiential reports; system state information; projections; forecasts. Proprietary data is aggregated and de-identified before it is shared in ASIAS. Level 1 will use a distributed network architecture with role-based, need-to-know access controls. The ASIAS Executive Board (AEB), comprised of stakeholder representatives, will govern the protection of and access to the information, prioritize studies, identify required resources, and disseminate findings among the stakeholders. The AEB coordinates with the Commercial Aviation Safety Team (CAST) regarding system hazards, assessing risk, identifying corrective actions and monitoring controls on an ongoing basis. ASIAS Level 1 will leverage existing data standards development activities including the Commercial Aviation Safety Team/ International Civil Aviation Organization (CAST/ICAO) Common Taxonomy Team and the Federal Data Registry. ASIAS Level 1 also includes the establishment and use of information sharing agreements that outline the specifics regarding use and access of the ASIAS capability. Standard operating procedures will be developed including data management, access, assurance and quality plans. Level 1 is a result of ASIAS Phase 1 activities.

SOPR: FAA		*Primary Supported OIs:* OI-3101	
SOCR:		*Primary Supported Enablers:* EN-3036, EN-3040	

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3016: Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 1	E	2008																
D-0170: Safety Information Sharing Environment	D	2006																
PI-0024: Secure Information Exchange	P	2008																
PI-0108: Certifying Use of Net-Centric Information	P	2008																

EN-3017   Safety Information Analysis Tools - Level 1

Description: Proven processes, techniques and tools to expand the analysis of safety information and increase the confidence in the analytical results. Level 1 capabilities to include text and data mining as well as system vulnerability discovery and system evidence gathering techniques. Level 1 tools support forensic and limited diagnostic analysis.

SOPR: FAA		*Primary Supported OIs:*	
SOCR:		*Primary Supported Enablers:* EN-3038, EN-3105	

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3017: Safety Information Analysis Tools - Level 1	E	2008																

EN-3018   Safety Management Requirements

Description: A systematic approach to safety management, which has as its cornerstones safety policy, Safety Risk Management (SRM), safety assurance, and safety promotion, provides a deliberate process for ensuring system safety. Generally referred to as a Safety Management System (SMS), the integrated elements of this systematic approach establish safety accountability at all levels within an organization, using quality management principles to identify and control safety risk. The SMS will promote the understanding, measurement, and improvement of the organization's safety culture. Providing a consistent framework for SMS throughout the government and industry will allow the creation of a system of SMS systems which will support the establishment of accountability at all levels within the Air Transportation System (ATS) and reliance on the cornerstones identified above for safety management. Requirements for safety policy with appropriate organizational support will be promulgated through the establishment of a National SMS Standard. In addition, the national SMS Standard will facilitate alignment and integration of SMSs at the national-level.

SOPR: FAA		*Primary Supported OIs:* OI-3004	
SOCR:		*Primary Supported Enablers:* EN-3040, EN-3041	

Enabler Group: Safer Practices Enablers

Enabler Listing

		08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3018: Safety Management Requirements		E	2008																
D-0160: SMS Standard		D	2006																
PI-0024: Secure Information Exchange		P	2008																
PI-0030: Safety Management Requirements		P	2008																
PI-0031: Safety National Leadership Organization		P	2008																
PI-0033: National Aviation Safety Strategic Plan (NASSP)		P	2008																
PI-0108: Certifying Use of Net-Centric Information		P	2008																

EN-3023   Automated System Vulnerability Detection

Description: Automated system vulnerability detection tools will be developed to monitor and analyze Aviation Safety Information Analysis and Sharing (ASIAS) and other safety data resources. The tools will analyze data from multiple sources providing enhanced discovery, identification, and evaluation of system safety risks. Safety information will include flight, radar, survey, weather and textual report data. The tools and associated processes will facilitate system vulnerability detection through the understanding of causal relationships among system phenomena identified through monitoring or query. Additionally, evidence gathering will be used to acquire and logically fuse system safety data extracted from large, distributed, and diverse data sources.

> *SOPR:* FAA   *Primary Supported OIs:* OI-3108
>
> *SOCR:*   *Primary Supported Enablers:* EN-3103, EN-3105

Enabler Group: Safer Practices Enablers

		08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3023: Automated System Vulnerability Detection					E	2011													
R-0020: Applied Research on Vulnerability Discovery			R	2009															
D-2145: Vulnerability Detection Tools			D	2009															

EN-3024   Advanced Incident Contributing Factor Analysis

Description: Advanced tools and processes are developed to improve the identification and analysis of contributing factors and causes of incidents and accidents. Improvements will include the reduction of the time and resources needed to conduct the identification and analysis as well as the quality of the results. Existing processes, such as those recommended by the Commercial Aviation Safety Team (CAST) and other groups, will be leveraged, enhanced and standardized as appropriate. This includes processes to analyze incident and accident data investigation information and the development of risk contributing factor taxonomies. Standard process are created within the Federal Aviation Administration (FAA) and CAST to relate observed aviation system state data such as traffic volume, complexity, density, environmental conditions (such as weather), aircraft and human performance factors to causal factors identified in the field. These tools and processes support the Safety Management System (SMS) methodology by improving Safety Risk Management (SRM).

> *SOPR:* FAA   *Primary Supported OIs:* OI-3108
>
> *SOCR:*   *Primary Supported Enablers:* EN-3103, EN-3105

Enabler Group: Safer Practices Enablers

		08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3024: Advanced Incident Contributing Factor Analysis				E	2010														
R-2132: Applied Research on Contributing Factor Analysis			R	2008															
D-2149: Contributing Factor Analysis Tools			D	2008															

Enabler Listing

EN-3025   Automated Prognostic Risk Identification

Description: Advanced tools and processes are developed to improve prognostic Safety Risk Management (SRM), including hazard identification and risk assessment. Improvements will include the reduction of the time and resources needed to conduct the identification and analysis as well as the quality of the results. Risk management will shift from a forensic/diagnostic environment to a more predictive method. These tools and processes will integrate observational data collected via the information sharing programs such as Aviation Safety Information Analysis and Sharing (ASIAS) supporting the causal factor identification to create a system level "monitor" of hazardous trends. The tools will flag and identify the occurrence of events or existence of system states, to the responsible safety manager (within any organization), that are similar to those that have been related to elevated risk levels in the past. The tools will reliably relate system risks to behaviors through a combination of historical data analyses, system performance observation, and statistical modeling. Outputs from the tools will include a risk index of event likelihood and hazard as well as alert observers to the possibility that an undesirable risk level may emerge. Additionally, this enabler will reduce the life-cycle time required to assess the performance of new and current systems to off-nominal conditions, and will extend the available data for analysis. This enabler will reduce time requirements for certification and training by incorporating specific, well documented "high risk" historical scenarios to use for evaluation of human performance responses to safety critical elements, along with a method to integrate international exposure data to those risks in near real-time.

SOPR: FAA	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-3103, EN-3105

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3025: Automated Prognostic Risk Identification			E	2010														
D-2151: Prognostic Risk Management Tools	D	2008																
D-1700: System Risk Assessment and Management Models	D	2008																

EN-3027   Improved Fault Management

Description: Fault management involves both prevention of and preparation for faults and failures. Planning for successful mitigation and management of these occurrences, and creating plans for system continuity, despite failures, contributes to a safe system. Tools and processes are needed that focus on managing the systemic impact of off-nominal conditions, and on developing a greater understanding of the propagation of fault and failure effects through systems. Implementation of fault prevention, fault tolerance, and fault recovery tools and processes will increase the robustness of the NextGen system by enabling tolerance of non-ideal conditions without compromising safety. The tools and processes will include linkages to the design assumptions in the enterprise and system architectures. These architectures will be analyzed for their potential for system risk propagation and designs will be recommended that make the system less likely to propagate risk.

SOPR: NASA	*Primary Supported OIs:* OI-3108
SOCR:	*Primary Supported Enablers:* EN-3103

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3027: Improved Fault Management			E	2010														
R-2136: Applied Research on Fault Management	R	2008																
D-2153: Fault Management Tools	D	2008																

Enabler Listing

EN-3030   Standards Harmonization for Multi-mode Transport of Dangerous Goods

Description: The standards for handling dangerous goods are harmonized domestically and internationally, for goods transported by air, and by multiple transportation modes that include air. Rapid, reliable delivery systems with the flexibility to reroute goods in transit to meet changing schedule demands in real time, routinely transition cargo through multiple modes of transportation. This results in cargo being transported by air after being accepted and packaged for another mode of transportation. Providing rapid, safe delivery, while managing risk in both domestic and international multi-modal transport is hampered by different and sometimes conflicting requirements for packaging and shipping the same materials via different modes and/or across international borders.

SOPR: Industry	*Primary Supported OIs:* OI-3107
SOCR:	*Primary Supported Enablers:*

Enabler Group: Safer Worldwide Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3030: Standards Harmonization for Multi-mode Transport of Dangerous Goods					E 2012													
PI-0107: Intermodal Safety Management Integration					P 2012													

EN-3036   Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 2

Description: Aviation Safety Information Analysis and Sharing (ASIAS) Level 2 builds upon Level 1 by expanding functionality and the use of net-centric technology. Level 2 allows NextGen Partner agencies to begin meeting the requirements found in the National Safety Management System (SMS) Standard. Level 2 includes the expansion and evolution of analytical tools and processes to identify and monitor system level issues. Simulation and modeling techniques will be employed, including fast time and Human In The Loop (HITL) simulation. Where appropriate, Level 2 will initiate the transition of ASIAS to a net-centric architecture, making aviation safety information available, secure, timely, and useable for approved aviation decision makers. This will be achieved by leveraging the common access and sharing capabilities of Federal Aviation Administration's (FAA's) System Wide Information Management (SWIM) and Department of Defense's (DOD's) Global Information Grid (GIG). The system safety baseline metrics will evolve to meet the stakeholder's needs and as new metrics are identified, ASIAS will actively look to expand its safety information resources. Additionally, system state information resources will be added as the ASIAS scope expands. Level 2 is a result of Phase 2 activities.

SOPR: FAA	*Primary Supported OIs:* OI-3109
SOCR:	*Primary Supported Enablers:* EN-3037, EN-3038, EN-3041

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3036: Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 2				E 2011														
EN-1180: Ground Integrated Voice/Data Network - Level 1	E 2008																	
EN-3016: Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 1	E 2008																	
EN-1253: Information Sharing Standards: Aviation Safety Information			E 2010															
EN-1231: NextGen Enterprise Network - FAA				E 2011														
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E 2011														
D-0170: Safety Information Sharing Environment		D 2009																
PI-0024: Secure Information Exchange	P 2008																	
PI-0031: Safety National Leadership Organization	P 2008																	
PI-0032: Government-Wide Safety Information Sharing				P 2011														

Enabler Listing

EN-3037   Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 3

Description: Aviation Safety Information Analysis and Sharing (ASIAS) Level 3 builds upon Level 2 by expanding the included stakeholders and functionality. Under the direction of the ASIAS Executive Board (AEB), ASIAS Level 3 will be expanded to additional NextGen stakeholders including general aviation, public aviation, rotorcraft, airports, commercial aviation operators and manufacturers. Level 3 will also evolve to include additional system safety metrics and modeling capabilities to support tactical, operational and forecasting requirements. All publicly available aviation safety information is discoverable in a net centric architecture. Additionally, a library of system safety metrics and models made available to stakeholders in Service Oriented Architecture (SOA). Level 3 is a result of Phase 3 activities.

SOPR: FAA   *Primary Supported OIs:* OI-3109
SOCR: *Primary Supported Enablers:* EN-3039, EN-3042

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3037: Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 3						E	2013											
EN-3036: Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 2					E	2011												
D-0170: Safety Information Sharing Environment					D	2011												
PI-0092: Network-Enabled Aviation Safety Information Sharing Environment - Stakeholders					P	2011												

EN-3038   Safety Information Analysis Tools - Level 2

Description: Proven processes, techniques and tools expand the analysis of safety information and increase the confidence in the analytical results, building upon Level 1 capability. Safety information is generally provided as incident/accident data, combined with information on causal factors. It is important to relate information on events to the environments within which they occurred. Statistical techniques will be applied to develop a model that can identify the relationship between conditions and incidents / accidents to provide a reliable method to associate system conditions and performance (such as traffic volume, environmental conditions such as weather and visibility, and events such as incidents/ accidents with high reliability.

SOPR: FAA   *Primary Supported OIs:*
SOCR: *Primary Supported Enablers:* EN-3039, EN-3105

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3038: Safety Information Analysis Tools - Level 2						E	2013											
EN-3017: Safety Information Analysis Tools - Level 1	E	2008																
EN-3036: Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 2					E	2011												

EN-3039   Safety Information Analysis Tools - Level 3

Description: Proven processes, techniques and tools to expand the analysis of safety information and increase the confidence in the analytical results. Building upon Level 2 capability, level 3 incorporates test data, demonstration program data, and real-time data via network provided information. Once reliable, statistically significant relationships can be estimated between observed system performance and risk, data can be fed to the model in real-time using system elements including aircraft, as nodes for observation. The methodology to create this real-time risk measure is the next improvement for safety evaluation.

SOPR: FAA   *Primary Supported OIs:*
SOCR: *Primary Supported Enablers:* EN-3105

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3039: Safety Information Analysis Tools - Level 3							E	2014										
EN-3037: Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 3						E	2013											
EN-3038: Safety Information Analysis Tools - Level 2						E	2013											

Enabler Listing

EN-3040   National SMS Standard Implementation - Level 1

Description: The Federal Aviation Administration (FAA) implements the National Safety Management System (SMS) Standard and complies with its requirements.

    SOPR: FAA   *Primary Supported OIs:* OI-3004

    SOCR: *Primary Supported Enablers:* EN-3041

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3040: National SMS Standard Implementation - Level 1			E 2010															
EN-3016: Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 1	E 2008																	
EN-3018: Safety Management Requirements	E 2008																	

EN-3041   National SMS Standard Implementation- Level 2

Description: All NextGen Federal Partners implement the National Safety Management System (SMS) Standard and comply with its requirements

    SOPR: FAA   *Primary Supported OIs:* OI-3004

    SOCR: *Primary Supported Enablers:* EN-3042

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3041: National SMS Standard Implementation- Level 2					E 2012													
EN-3018: Safety Management Requirements	E 2008																	
EN-3040: National SMS Standard Implementation - Level 1			E 2010															
EN-3036: Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 2				E 2011														

EN-3042   National SMS Standard Implementation- Level 3

Description: NextGen Industry Partners including manufacturers and suppliers implement the National Safety Management System (SMS) Standard and comply with its requirements.

    SOPR: Industry   *Primary Supported OIs:* OI-3004

    SOCR: *Primary Supported Enablers:*

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3042: National SMS Standard Implementation- Level 3							E 2014											
EN-3041: National SMS Standard Implementation- Level 2					E 2012													
EN-3037: Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 3						E 2013												

EN-3050   Advanced Complex System Validation and Verification Methods

Description: Advanced tools and processes are developed to improve the verification and validation of complex systems and software. Improvements will focus on reducing the time and resources needed to conduct validation and verification as well as improving the quality of the results. The advanced tools and processes will be created using the combined results of analysis, research and development. Advanced tools and processes such as fast time, real time, and human in the loop simulations will be used to test and evaluate complex systems and software.   They will replace and substitute for exhaustive testing. The tools and processes will provide estimates of system risks associated with complex system and software deployment. They will use standards protocols for system simulation and support the creation of a standard protocol for implementation. The tools and processes will establish the minimum acceptability criteria and risk standards applied for Validation and Verification (V&V).

    SOPR: NASA   *Primary Supported OIs:* OI-3102

    SOCR: *Primary Supported Enablers:*

Enabler Group: Safer Practices Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3050: Advanced Complex System Validation and Verification Methods					E	2012												
D-2100: Complex System Validation and Verification Tools and Techniques			D	2010														

EN-3054   Improved Reliability and Airworthiness of Aircraft - Level 1

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce system-level failures and reduce diversions or non-complete missions. These technologies will bring about greater reliability of aircraft's systems, including controls, avionics, and data and information management, as well as, the long-term structural airworthiness of new materials and advanced aircraft designs. The performance measures of this strategy will be reduced systems' failures and reduced diversions or non-complete missions due to systems' problems. (Level 1 - less difficult improvements, component level)

     SOPR: Industry   *Primary Supported OIs:*

     SOCR: *Primary Supported Enablers:* EN-3055, EN-3113

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3054: Improved Reliability and Airworthiness of Aircraft - Level 1								E	2015									
R-1190: Applied Research on Certification Methods, Requirements, and Standards for UASs						R	2013											
D-2163: Reliability and Airworthiness of Aircraft Design Guidelines						D	2013											
PI-0004: ATM Automation Development, Performance and Interoperability Standards						P	2013											

EN-3055   Improved Reliability and Airworthiness of Aircraft - Level 2

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce system-level failures and reduce diversions or non-complete missions. These technologies will bring about greater reliability of aircraft™s systems, including controls, avionics, and data and information management, as well as, the long-term structural airworthiness of new materials and advanced aircraft designs. The performance measures of this strategy will be reduced systems™ failures and reduced diversions or non-complete missions due to systems™ problems. (Level 2- difficult, system level, new design)

     SOPR: Industry   *Primary Supported OIs:*

     SOCR: *Primary Supported Enablers:* EN-3113

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3055: Improved Reliability and Airworthiness of Aircraft - Level 2																	2025	E
EN-3054: Improved Reliability and Airworthiness of Aircraft - Level 1								E	2015									
R-1190: Applied Research on Certification Methods, Requirements, and Standards for UASs																R	2023	
D-2163: Reliability and Airworthiness of Aircraft Design Guidelines																D	2023	

EN-3056   Improved Vehicle Systems Health Management - Level 1

Description: As design guidelines are developed (continuous), implement technologies that reduce systems failures or impact of failures that occur. An important part of the aircraft is the vehicle health monitoring system. Advanced monitoring systems will integrate information from various sensors to not only identify and mitigate sub-system failures, but send information to dispatch and maintenance so that trends may be assessed to avert potential failures. The performance measure is reduced systems failures or reduced impact of those failures that occur. (Level 1 - less difficult improvements, component level).

     SOPR: Industry   *Primary Supported OIs:* OI-3104

     SOCR: *Primary Supported Enablers:* EN-3057

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3056: Improved Vehicle Systems Health Management - Level 1								E	2015									
D-2165: Vehicle Systems Health Management Design Guidelines						D	2013											

Enabler Listing

EN-3057   Improved Vehicle Systems Health Management - Level 2

Description: As design guidelines are developed (continuous), implement technologies that reduce systems failures or impact of failures that occur. An important part of the aircraft is the vehicle health monitoring system. Advanced monitoring systems will integrate information from various sensors to not only identify and mitigate sub-system failures, but send information to dispatch and maintenance so that trends may be assessed to avert potential failures. The performance measure is reduced systems failures or reduced impact of those failures that occur. (Level 2 - difficult improvements, total vehicle health)

    SOPR: Industry   *Primary Supported OIs:* OI-3104

    SOCR: *Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3057: Improved Vehicle Systems Health Management - Level 2																	2025	E
EN-3056: Improved Vehicle Systems Health Management - Level 1								E	2015									
D-2165: Vehicle Systems Health Management Design Guidelines																D	2023	

EN-3058   Increased Reliability and Accuracy of Data and Information - Level 1

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce data acquisition, processing and display errors. These technologies will increase the reliability and accuracy of data/information, with a performance measure of reduced data acquisition, processing, and display errors. (Level 1 - less difficult improvements, component level)

    SOPR: Industry   *Primary Supported OIs:* OI-3104

    SOCR: *Primary Supported Enablers:* EN-3059

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3058: Increased Reliability and Accuracy of Data and Information - Level 1								E	2015									
D-2167: Reliability and Accuracy of Data and Information Design Guidelines						D	2013											

EN-3059   Increased Reliability and Accuracy of Data and Information - Level 2

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce data acquisition, processing and display errors. These technologies will increase the reliability and accuracy of data/information, with a performance measure of reduced data acquisition, processing, and display errors. (Level 2 - difficult, system level, new design)

    SOPR: Industry   *Primary Supported OIs:* OI-3104

    SOCR: *Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3059: Increased Reliability and Accuracy of Data and Information - Level 2																	2025	E
EN-3058: Increased Reliability and Accuracy of Data and Information - Level 1								E	2015									
D-2167: Reliability and Accuracy of Data and Information Design Guidelines																D	2023	

EN-3060   Improved Operational Decision Aids - Airborne Level 1

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce time required to optimize decisions and reduce the number of hazards encountered. These technologies will improve the awareness and mitigate response to airborne events and hazards. The performance measures are reduced time required to optimize decisions and a reduced number of hazards actually encountered. (Level 1 - less difficult improvements, component level)

    SOPR: Industry   *Primary Supported OIs:* OI-3103

    SOCR: *Primary Supported Enablers:* EN-3061

Enabler Group: Safer Systems Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3060: Improved Operational Decision Aids - Airborne Level 1								E	2015									
R-2121: Applied Research of Human Performance Models						R	2013											
R-2138: Applied Research on Human Error Using Automated Systems						R	2013											
D-2161: Operational Decision Aids Design Guidelines						D	2013											
D-1710: Risk Reducing Interfaces, Procedures, and Training						D	2013											

EN-3061   Improved Operational Decision Aids - Airborne Level 2

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce time required to optimize decisions and reduce the number of hazards encountered. These technologies will improve the awareness and mitigate response to airborne events and hazards. The performance measures are reduced time required to optimize decisions and a reduced number of hazards actually encountered. (Level 2 - difficult, system level, new design)

> *SOPR:* Industry   *Primary Supported OIs:* OI-3103
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3061: Improved Operational Decision Aids - Airborne Level 2																	2025	E
EN-3060: Improved Operational Decision Aids - Airborne Level 1								E	2015									
R-2121: Applied Research of Human Performance Models																R	2023	
R-2138: Applied Research on Human Error Using Automated Systems																R	2023	
D-2161: Operational Decision Aids Design Guidelines																D	2023	
D-1710: Risk Reducing Interfaces, Procedures, and Training																D	2023	

EN-3062   Ensure Aircraft Conformance to More Stringent Operations Requirements - Level 1

Description: As design guidelines are developed (continuous), implement technologies that reduce deviations from new operating procedures. NextGen will require increased navigation, guidance, and control accuracy so that reduced separation and Trajectory-Based Operations (TBO) will become a reality in an environment of close-in curved approaches where environmental effects are minimized. These technologies will improve the conformance of the aircraft to more stringent operations requirements, with a performance measure of reduced deviations from these new operating requirements. (Level 1 - less difficult improvements, component level)

> *SOPR:* Industry   *Primary Supported OIs:* OI-3104
>
> *SOCR:*   *Primary Supported Enablers:* EN-3063

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3062: Ensure Aircraft Conformance to More Stringent Operations Requirements - Level 1								E	2015									
D-2147: Airborne Collision Avoidance Back-up System						D	2013											
D-2169: Aircraft Conformance to Operations Requirements Design Guidelines						D	2013											

EN-3063   Ensure Aircraft Conformance to More Stringent Operations Requirements - Level 2

Description: As design guidelines are developed (continuous), implement technologies that reduce deviations from new operating procedures. NextGen will require increased navigation, guidance, and control accuracy so that reduced separation and Trajectory-Based Operations (TBO) will become a reality in an environment of close-in curved approaches where environmental effects are minimized. These technologies will improve the conformance of the aircraft to more stringent operations requirements, with a performance measure of reduced deviations from these new operating requirements. (Level 2 - difficult, system level, new design)

> *SOPR:* Industry   *Primary Supported OIs:* OI-3104
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3063: Ensure Aircraft Conformance to More Stringent Operations Requirements - Level 2																	**2025**	**E**
EN-3062: Ensure Aircraft Conformance to More Stringent Operations Requirements - Level 1								**E**	2015									
D-2147: Airborne Collision Avoidance Back-up System																**D**	2023	
D-2169: Aircraft Conformance to Operations Requirements Design Guidelines																**D**	2023	

EN-3064 Increase Aircraft System Contributions to Survival in Crash Scenarios - Level 1

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce fatalities due to post crash fires, toxic fumes, and/or impact loads. These technologies will increase survival in crash scenarios, with the performance measure of reduced fatalities due to post crash fires, toxic fumes, and/or impact loads. (Level 1 - less difficult improvements, component level).

> *SOPR:* Industry   *Primary Supported OIs:* OI-3104
> *SOCR:*   *Primary Supported Enablers:* EN-3065

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3064: Increase Aircraft System Contributions to Survival in Crash Scenarios - Level 1								**E**	2015									
EN-3130: Increased Crash Survivability - Aircraft Structures & Components								**E**	2015									
EN-3131: Increased Crash Survivability- Aircraft Fire Prevention & Suppression								**E**	2015									
D-2171: Aircraft System Contributions to Survival in Crash Scenarios Design Guidelines						**D**	2013											

EN-3065 Increase Aircraft System Contributions to Survival in Crash Scenarios- Level 2

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce fatalities due to post crash fires, toxic fumes, and/or impact loads. These technologies will increase survival in crash scenarios, with the performance measure of reduced fatalities due to post crash fires, toxic fumes, and/or impact loads. (Level 2 - difficult, system level, new design)

> *SOPR:* Industry   *Primary Supported OIs:* OI-3104
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3065: Increase Aircraft System Contributions to Survival in Crash Scenarios- Level 2																	**2025**	**E**
EN-3064: Increase Aircraft System Contributions to Survival in Crash Scenarios - Level 1								**E**	2015									
EN-3130: Increased Crash Survivability - Aircraft Structures & Components								**E**	2015									
EN-3131: Increased Crash Survivability- Aircraft Fire Prevention & Suppression								**E**	2015									
D-2171: Aircraft System Contributions to Survival in Crash Scenarios Design Guidelines																**D**	2023	

EN-3066 Improved Ground-Based Systems Health Management - Level 1

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce systems failures or impact of failures that occur. These ground-based systems will manage information flow, aid in decision-making, and perform monitoring functions to reduced systems failures or reduced impact of failures that occur. (Level 1 - less difficult improvements, component level)

> *SOPR:* Airport Operator   *Primary Supported OIs:* OI-3105
> *SOCR:*   *Primary Supported Enablers:* EN-3067

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3066: Improved Ground-Based Systems Health Management - Level 1								**E**	2015									
D-2173: Ground-Based Systems Health Management Design Guidelines						**D**	2013											

Enabler Listing

EN-3067   Improved Ground-Based Systems Health Management - Level 2

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce systems failures or impact of failures that occur. These ground-based systems will manage information flow, aid in decision-making, and perform monitoring functions to reduced systems failures or reduced impact of failures that occur. (Level 2 - difficult, system level, new design)

SOPR: FAA   *Primary Supported OIs:* OI-3105

SOCR: *Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3067: Improved Ground-Based Systems Health Management - Level 2																	2025	E
EN-3066: Improved Ground-Based Systems Health Management - Level 1								E	2015									
D-2173: Ground-Based Systems Health Management Design Guidelines																D	2023	

EN-3068   Improve Operational Decision Aids - Ground Level 1

Description: Implement and deploy ground-based technologies that improve the response and reduce the decision time in response to system anomalies. Ground-based systems will provide relevant information tailored to the system state and will guide decision making in response to anomalies. These technologies will reduce the risk associated with hazard encounters and reduce the time required to optimize decisions. Level one applies to sub-system level decision aids.

SOPR: FAA   *Primary Supported OIs:* OI-3103

SOCR: *Primary Supported Enablers:* EN-3069

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3068: Improve Operational Decision Aids - Ground Level 1								E	2015									
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E	2011													
R-2121: Applied Research of Human Performance Models						R	2013											
R-2138: Applied Research on Human Error Using Automated Systems						R	2013											
D-2161: Operational Decision Aids Design Guidelines						D	2013											
D-1710: Risk Reducing Interfaces, Procedures, and Training						D	2013											

EN-3069   Improve Operational Decision Aids - Ground Level 2

Description: Implement and deploy ground-based technologies that improve the response and reduce the decision time in response to system anomalies. Ground-based systems will provide relevant information tailored to the system state and will guide decision making in response to anomalies. These technologies will reduce the risk associated with hazard encounters and reduce the time required to optimize decisions. Level two applies to system level decision aids.

SOPR: FAA   *Primary Supported OIs:* OI-3103

SOCR: *Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3069: Improve Operational Decision Aids - Ground Level 2																	2025	E
EN-3068: Improve Operational Decision Aids - Ground Level 1								E	2015									
R-2121: Applied Research of Human Performance Models																R	2023	
R-2138: Applied Research on Human Error Using Automated Systems																R	2023	
D-2161: Operational Decision Aids Design Guidelines																D	2023	
D-1710: Risk Reducing Interfaces, Procedures, and Training																D	2023	

Enabler Listing

EN-3070   Ensure Ground-based System Conformance to Operations Requirements - Level 1

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce deviations from new operating procedures. Ground-based systems will assist in collaborative Air Traffic Management (ATM), especially in super dense operations where a minimum, safe separation of aircraft from each other, terrain and obstacles, and wake turbulence, will enable capacity increases. These technologies will improve the conformance to more stringent operations requirements with a performance measure of reduced deviations for new operating procedures. (Level 1 - less difficult improvements, component level).

SOPR: FAA   *Primary Supported OIs:* OI-3105
SOCR: *Primary Supported Enablers:* EN-3071

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3070: Ensure Ground-based System Conformance to Operations Requirements - Level 1								E 2015										
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E 2011														
D-2175: Ground-Based System Conformance Design Guidelines						D 2013												

EN-3071   Ensure Ground-based System Conformance to Operations Requirements - Level 2

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce deviations from new operating procedures. Ground-based systems will assist in collaborative Air Traffic Management (ATM), especially in super dense operations where a minimum, safe separation of aircraft from each other, terrain and obstacles, and wake turbulence, will enable capacity increases. These technologies will improve the conformance to more stringent operations requirements with a performance measure of reduced deviations for new operating procedures. (Level 2 - difficult, system level, new design).

SOPR: FAA   *Primary Supported OIs:* OI-3105
SOCR: *Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3071: Ensure Ground-based System Conformance to Operations Requirements - Level 2																2025		E
EN-3070: Ensure Ground-based System Conformance to Operations Requirements - Level 1								E 2015										
D-2175: Ground-Based System Conformance Design Guidelines																D 2023		

EN-3072   Increase Ground-based System Contribution to Survival in Crash Scenarios - Level 1

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce emergency response time and reduce fatalities due to crash conditions. In the unfortunate event of an accident, advanced ground-systems for restraining aircraft from an overrun or other abnormal landing situations, and recognizing and responding quickly to the crash scene will be deployed. The performances measures are reduced emergency response time and reduced fatalities due to crash conditions. (Level 1 - less difficult improvements, component level)

SOPR: FAA   *Primary Supported OIs:* OI-3105
SOCR: *Primary Supported Enablers:* EN-3073

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3072: Increase Ground-based System Contribution to Survival in Crash Scenarios - Level 1								E 2015										
D-2177: Ground-Based System Contribution to Survival in Crash Scenarios Design Guidelines						D 2013												

Enabler Listing

EN-3073   Increase Ground-based System Contribution to Survival in Crash Scenarios - Level 2

Description: As design guidelines are developed (continuous), implement and deploy technologies that reduce emergency response time and reduce fatalities due to crash conditions. In the unfortunate event of an accident, advanced ground-systems for restraining aircraft from an overrun or other abnormal landing situations, and recognizing and responding quickly to the crash scene will be deployed. The performances measures are reduced emergency response time and reduced fatalities due to crash conditions. (Level 2 - difficult, system level, new design)

SOPR: FAA   *Primary Supported OIs:* OI-3105

SOCR: *Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3073: Increase Ground-based System Contribution to Survival in Crash Scenarios - Level 2																	2025	E
EN-3072: Increase Ground-based System Contribution to Survival in Crash Scenarios - Level 1								E	2015									
D-2177: Ground-Based System Contribution to Survival in Crash Scenarios Design Guidelines																D	2023	

EN-3101   Safety Policy Effectiveness

Description: Efforts to determine and document the effectiveness of various methods used to comply with National Safety Management System (SMS) Standards safety policy requirements are used to improve safety policy. Best practices are detailed and communicated to SMS practitioners through SMS guidance materials. The measures of effectiveness are documented and used in SMS audit processes.

SOPR: FAA   *Primary Supported OIs:* OI-3108

SOCR: *Primary Supported Enablers:*

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3101: Safety Policy Effectiveness											E	2018						

EN-3102   Safety Risk Management Processes and Tools

Description: Improvements to Safety Risk Management (SRM) processes and tools result from research into analysis methods, risk estimation techniques, fault management, and other aspects of SRM. Routinizing SRM processes and reducing the SRM cycle time will reduce the potential for recurrence of incidents and accidents from known risks.

SOPR: FAA   *Primary Supported OIs:* OI-3108

SOCR: *Primary Supported Enablers:*

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3102: Safety Risk Management Processes and Tools											E	2018						
R-0690: Applied Research on an ATS Safety Baseline									R	2016								

EN-3103   Safety Assurance Processes and Tools

Description: Improvements to safety assurance processes and tools result from research into safety monitoring methods, unexposed risk surveillance techniques, comprehensive logical modeling and simulation to determine the contribution of singular actions to system-level risk outcomes, and methods to extract context from textual data, synthesize data from numerous diverse databases, and quantify causal relationships.

SOPR: FAA   *Primary Supported OIs:* OI-3108, OI-3109

SOCR: *Primary Supported Enablers:*

Enabler Group: Safer Practices Enablers

<table>
<tr><td colspan="2" align="center">Enabler Listing</td></tr>
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	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3103: Safety Assurance Processes and Tools											E 2018							
EN-3024: Advanced Incident Contributing Factor Analysis			E 2010															
EN-3025: Automated Prognostic Risk Identification			E 2010															
EN-3027: Improved Fault Management			E 2010															
EN-3023: Automated System Vulnerability Detection				E 2011														
R-0020: Applied Research on Vulnerability Discovery									R 2016									
D-2145: Vulnerability Detection Tools									D 2016									

EN-3104   Safety Promotion Practices

Description: Safety Management System (SMS) requirements for safety promotion are improved through development of safety culture metrics and enhancements, improvements in safety communication and awareness processes, advanced safety knowledge management methods, and refinement of safety personnel competency requirements.

>   *SOPR:* FAA   *Primary Supported OIs:* OI-3108

>   *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3104: Safety Promotion Practices											E 2018							

EN-3105   Increase Data Access for Safety Risk Management

Description: Implement policies that permit data access throughout government and industry for the sole purpose of safety analysis. This will require enhancing protections for data shared between government agencies and industry, implementing information technologies that permit secure remote access, and enacting guarantees that limit information access and release. Increased data access will permit both government and industry experts to examine more comprehensive data for risk factors than could be accessed within individual organizations.

>   *SOPR:* FAA   *Primary Supported OIs:* OI-3101, OI-3109

>   *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3105: Increase Data Access for Safety Risk Management							E 2014											
EN-3017: Safety Information Analysis Tools - Level 1	E 2008																	
EN-3024: Advanced Incident Contributing Factor Analysis			E 2010															
EN-3025: Automated Prognostic Risk Identification			E 2010															
EN-3023: Automated System Vulnerability Detection				E 2011														
EN-3038: Safety Information Analysis Tools - Level 2						E 2013												
EN-3039: Safety Information Analysis Tools - Level 3							E 2014											

EN-3106   Increase Confidence in Analytical Results

Description: Demonstrate the validity of safety risk analytic techniques and the reliability of the results. Achieving this requires ensuring that the data meets minimum standards for integrity, and that the most appropriate and useful data are analyzed. Unambiguously characterizing data sources to identify the limitations associated with their data and its analysis is critical to placing confidence in the results.

>   *SOPR:* FAA   *Primary Supported OIs:* OI-3109

>   *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3106: Increase Confidence in Analytical Results											E 2018							

Enabler Listing

EN-3107   Advanced Capabilities for Integrated, Predictive Safety Assessment

Description: Current Safety Risk Management (SRM) practices focus on ensuring the safety of individual elements of systems, but not on the aviation system as a whole. The underlying assumption in this approach is that, if each component of the system is shown to have acceptable risk, the system as a whole will have acceptable risk. This assumption is invalid, especially for complex systems where interactions between elements occur on multiple levels. Characterizing direct and indirect system interactions can help to promote a greater understanding of "system of system" behaviors. New assessment techniques are needed to consider safety from a macro perspective to ensure that, as systems become more complex, our understanding of and ability to manage system safety risk is maintained or enhanced. Rapid prototyping of complex systems is a critical component of this macro-level understanding, permitting system developers to engage in full mission simulation, helping the identification of system safety considerations. Ultimately, adaptation of analytic tools used to consider system-wide interactions is needed to monitor system safety performance in real or near-real time to speed the discovery of emergent system safety risks. While these tools may provide early detection of system safety risks, they will not be able to predict them. Work is also needed to develop reliable predictions of system safety risk based on individual behaviors, both in nominal and in off-nominal conditions, within the system. Although prediction for human behavior is less reliable than for technology, reasonable estimations of human performance can be simulated to determine whether the system meets an acceptable level of risk.

> *SOPR:* FAA   *Primary Supported OIs:* OI-3102
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3107: Advanced Capabilities for Integrated, Predictive Safety Assessment							E 2014											

EN-3108   Enhanced Focus on Safe Operational Procedures

Description: NextGen concepts will be realized through the execution of new and improved operational procedures. Updated procedures will be required to support new ground-based and airborne systems in the areas of communication, navigation, surveillance, air traffic management, vehicle systems, manufacturing methods, systems health management, and maintenance. The safety of these operational procedures must be assured at multiple levels beginning with an examination of the overall structure of NextGen and its concepts. As NextGen operational improvements are refined and their enabling technologies are developed, continued focus on their safety implications must be maintained and safety requirements must be integrated into the development of operational procedures associated with them. Rapidly evolving human roles and responsibilities, as well as human-centered interfaces, will be associated with technological advances. The procedures developed to make use of these advances must focus on effective information management and use of decision aids, enhanced communication, and situation awareness.

> *SOPR:* FAA   *Primary Supported OIs:* OI-3102
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3108: Enhanced Focus on Safe Operational Procedures							E 2014											
D-1710: Risk Reducing Interfaces, Procedures, and Training					D 2012													

Enabler Listing

EN-3109   Advanced Training Concepts for Safe System Operation

Description: Training programs, when designed effectively, ensure that all operators carry out operational procedures as intended, in a consistent and standardized manner. Enhancements in training methods and scope will be required to support a successful transition to NextGen, with new and advanced systems and procedures, and new roles and responsibilities across an array of domains. With advances in technology, operators will be trained as operations monitors, with automation performing many of the functions now routinely performed by humans. As humans perform these functions less frequently, if they are expected to do so in response to system degradation or failure, new methods for maintaining proficiency and retention will be needed. Training methods will be developed and verified to meet the needs of new human-centered interfaces and methods of communication, with a focus on individual and group situation awareness. In addition, advanced training methods must be developed to accommodate the rapid fluctuations in market demand and supply for front-line operators at all levels in the aviation system (e.g., pilots, mechanics, and air traffic controllers). A key perspective in developing effective training programs is the concept that operators must be trained to proficiency versus to compliance, where training only meets minimum requirements of federal guidelines or standards agreed to between the operator and oversight agency.

SOPR: FAA   **Primary Supported OIs:** OI-3102

SOCR: **Primary Supported Enablers:**

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3109: Advanced Training Concepts for Safe System Operation								E 2014										
D-1710: Risk Reducing Interfaces, Procedures, and Training					D 2012													

EN-3110   Ensure the Availability and Accessibility of Required Information

Description: Provide and assure the continuity of critical information and limit the manipulation required for operator access.

SOPR: Industry   **Primary Supported OIs:** OI-3103

SOCR: **Primary Supported Enablers:**

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3110: Ensure the Availability and Accessibility of Required Information								E 2015										
R-2121: Applied Research of Human Performance Models						R 2013												
R-2130: Applied Research on Risk-Reducing Systems Interfaces, Procedures, and Training						R 2013												
R-2138: Applied Research on Human Error Using Automated Systems						R 2013												
D-2155: Availability and Accessibility of Required Information Design Guidelines						D 2013												
D-1710: Risk Reducing Interfaces, Procedures, and Training						D 2013												

EN-3111   Increase the Usefulness and Understandability of Information

Description: System interfaces that target the reduction of human error due to misunderstanding of system information. Greater usefulness and understandability of information will improve situation awareness. This applies equally to airborne and ground-based systems.

SOPR: Industry   **Primary Supported OIs:** OI-3103

SOCR: **Primary Supported Enablers:**

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3111: Increase the Usefulness and Understandability of Information								E 2015										
R-2121: Applied Research of Human Performance Models						R 2013												
R-2130: Applied Research on Risk-Reducing Systems Interfaces, Procedures, and Training						R 2013												
R-2138: Applied Research on Human Error Using Automated Systems						R 2013												
D-2157: Usefulness and Understandability of Information Design Guidelines						D 2013												
D-1710: Risk Reducing Interfaces, Procedures, and Training						D 2013												

Enabler Listing

EN-3112   Maintain Appropriate Human Engagement

Description: To meet demands for capacity and safety, the current trend toward automated systems with increased capabilities will continue. System designers must consider the limits of human performance in both nominal and off-nominal conditions, to secure and maintain the operator's attention without exceeding their ability to interact and process. When system degradation prompts an automated reversion to lower system performance limits, automation-to-automation design integrity is critical. An appropriate allocation of human versus automation functions will decrease the possibility for automation complacency in highly automated environments, will allow the operator to successfully attend to and satisfy the most pressing tasks, and will free the operator from time-critical decisions reliably made by automation – resulting in fewer instances of inappropriate human intervention.

SOPR: Industry	*Primary Supported OIs:* OI-3103
SOCR:	*Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3112: Maintain Appropriate Human Engagement								E 2015										
R-2121: Applied Research of Human Performance Models						R 2013												
R-2130: Applied Research on Risk-Reducing Systems Interfaces, Procedures, and Training						R 2013												
R-2138: Applied Research on Human Error Using Automated Systems						R 2013												
D-2159: Appropriate Human Engagement Design Guidelines						D 2013												
D-1710: Risk Reducing Interfaces, Procedures, and Training						D 2013												

EN-3113   Improve Reliability and Airworthiness of Aircraft

Description: Increase the reliability of control, avionics, and Information Management Systems (IMS), as well as the long-term structural airworthiness of new materials and advanced aircraft designs. The result will be reduced systems failures and reduced diversions or incomplete missions.

SOPR: Industry	*Primary Supported OIs:* OI-3104
SOCR:	*Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3113: Improve Reliability and Airworthiness of Aircraft																	2025	E
EN-3054: Improved Reliability and Airworthiness of Aircraft - Level 1								E 2015										
EN-3055: Improved Reliability and Airworthiness of Aircraft - Level 2																	2025	E

EN-3114   Participate Internationally in Aviation Forums

Description: Participation in aviation forums in safety, capacity, and other domains will provide information to the international community on NextGen concepts and their safety implications. The United States effort to modernize its air transportation system is just one of many such efforts underway globally. Europe is developing the Single European Sky Air Traffic Management (ATM) Research (SESAR) master plan, similar in many respects to the NextGen plan. Like the U.S., Australia is deploying Automatic Dependent Surveillance-Broadcast (ADS-B) technology to provide expanded Air Traffic Services in national and oceanic airspace that they manage. Africa and China are developing their ATSs with the direct assistance of the Federal Aviation Administration (FAA). Harmonization with multiple countries with independent modernization efforts poses a significant challenge.

SOPR: FAA	*Primary Supported OIs:* OI-3106
SOCR:	*Primary Supported Enablers:*

Enabler Group: Safer Worldwide Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3114: Participate Internationally in Aviation Forums									E 2016									

Enabler Listing

EN-3115   Establish International Aviation Development Partnerships

Description: Entering into formal international partnerships will permit collaboration on research and development for aviation systems, technologies, and practices, and on implementation planning. The United States' effort to modernize its air transportation system is just one of many such efforts underway globally. Europe is developing the Single European Sky Air Traffic Management (ATM) Research (SESAR) master plan, similar in many respects to the NextGen plan. Like the U.S., Australia is deploying Automatic Dependent Surveillance-Broadcast (ADS-B) technology to provide expanded Air Traffic Services in national and oceanic airspace that they manage. Africa and China are developing their ATSs with the direct assistance of the Federal Aviation Administration (FAA). Harmonization with multiple countries with independent modernization efforts poses a significant challenge.

SOPR: FAA	*Primary Supported OIs:* OI-3106
SOCR:	*Primary Supported Enablers:*

Enabler Group: Safer Worldwide Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3115: Establish International Aviation Development Partnerships									E	2016								

EN-3116   Support Execution of ICAO Global Aviation Safety Roadmap and Implementation Plan

Description: In 2006, International Civil Aviation Organization (ICAO) endorsed the Global Aviation Safety Roadmap (GASR), which provides a framework for the coordination, integration, and implementation of ICAO safety initiatives and policies. The roadmap identifies 12 focus areas that industry has accepted as required to enhance safety within commercial aviation globally, and includes an implementation plan that identifies the tasks necessary to achieve the associated objectives. The GASR focus areas provide direct analogs to many of the objectives and strategies of this plan. The GASR implementation plan calls for the development of regional action plans that recognize the regional capacity to undertake sophisticated safety initiatives and their obligation to correct deficiencies already noted. The U.S. will create a North American Region plan in cooperation with Canada, our regional partner. The U.S. will also provide support for international improvement through direct financial and technical assistance, and sharing lessons learned in the development and execution of other regionsâ ™ plans.

SOPR: FAA	*Primary Supported OIs:* OI-3106
SOCR:	*Primary Supported Enablers:*

Enabler Group: Safer Worldwide Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3116: Support Execution of ICAO Global Aviation Safety Roadmap and Implementation Plan									E	2016								
PI-0094: Aviation Safety - Global Harmonization									P	2016								

EN-3118   Improve the Implementation of Harmonized Standards, Regulations, and Procedures

Description: Even with internationally harmonized standards and procedures, the potential exists for non-standard implementation and non-conforming operations. These non-standard practices contribute directly to increased safety risk. The U.S. must actively seek to identify instances of its own non-standard implementation and correct them through active participation in the International Civil Aviation Organization (ICAO) audit processes and through self-auditing of National Airspace System (NAS) operations. In addition, the U.S. will offer assistance to other countries in correcting ICAO identified deficiencies, ensure transparency of U.S. compliance, and share information and lessons learned.

SOPR: FAA	*Primary Supported OIs:* OI-3107
SOCR:	*Primary Supported Enablers:*

Enabler Group: Safer Worldwide Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3118: Improve the Implementation of Harmonized Standards, Regulations, and Procedures									E	2016								

Enabler Listing

EN-3119   Integrated Safety Assurance and Risk Management - Level 1

Description: This enabler will reduce the risk of accidents and incidents through enhanced analysis of safety data/information in the Air Transportation System (ATS). Safety analysis is enhanced through the collection and sharing of safety data across the Air Transportation System (ATS) and the consistent application of safety assurance and prognostic methods of identifying and assessing risks. This enabler begins the transformation from reactive safety management to a more integrated proactive approach that requires advancing the methods used to identify and mitigate latent and emergent safety risk in the ATS. Vulnerabilities, hazards, threats, etc. are sought, identified, and managed before they result in an incident or accident. An integrated risk management capability is developed to evaluate the performance of individual capabilities (existing or planned) in the context of their net impact on risk (safety assessments) and the interdependencies of related capabilities and their impact on overall system risk. An integrated analysis promotes the capability to support a National Safety Management System, per OI 3004. Level 1 stakeholders include National Aeronautics and Space Administration (NASA), Federal Aviation Administration (FAA), and where appropriate, industry partners. Level 1 leverages and integrates existing architectures, systems, data sources, tools, policies and procedures. The success of this enabler is dependent on a trusted safety information sharing environment, based on elements of a positive safety culture (e.g., informed culture, reporting culture). Government/industry safety information sharing agreements are formalized.

SOPR: FAA	*Primary Supported OIs:* OI-3101
SOCR:	*Primary Supported Enablers:* EN-3120

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3119: Integrated Safety Assurance and Risk Management - Level 1				E	2011													
PI-0024: Secure Information Exchange	P	2008																
PI-0108: Certifying Use of Net-Centric Information	P	2008																

EN-3120   Integrated Safety Assurance and Risk Management - Level 2

Description: Level 2 represents an expansion of what will be accomplished in Level 1 by adding data providers, analysis capabilities, and tools. The Integrated Risk Management (IRM) capability evolves to evaluate the performance of individual systems (existing or planned) in the context of their net impact on risk (safety assessments) and the impact on overall system risk (integrated system safety analysis) is required. The combination of individual assessments and integrated analysis promotes the capability to support Safety Management Systems (SMS). System state information, including weather information, is fused with other sources to support IRM activities. Stakeholder population is expanded to include all Joint Planning and Development Office (JPDO) member agencies. This expansion enables member agencies to meet two SMS requirements, OI-3004, including Safety Assurance and Safety Risk Management (SRM). Rate of Level 2 expansion is commensurate with the rate at which member agencies implement SMS. The aviation safety executive body is expanded to include member agency decision makers as appropriate. The Level 2 capability is aligned with the multi-agency aviation information sharing policies. Level 2 meets prescribed net centric aviation information sharing federal architecture requirements found in the Information Management & Exchange (IMEX) Plan and National Aviation Information Sharing Strategy including standards, protocols, technologies, governance models, and data strategies as described in Section 8. Safety information integration requirements are determined by the aviation safety executive body. Safety data analysis and risk management tools and processes are made available to Level 2 stakeholders where appropriate. Level 2 tools are intended to reduce SRM and safety assurance cycle time as well as increase confidence in the analytical processes.

SOPR: FAA	*Primary Supported OIs:* OI-3108, OI-3109
SOCR:	*Primary Supported Enablers:* EN-3121

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3120: Integrated Safety Assurance and Risk Management - Level 2							E	2014										
EN-3119: Integrated Safety Assurance and Risk Management - Level 1				E	2011													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E	2013											
PI-0031: Safety National Leadership Organization	P	2008																
PI-0032: Government-Wide Safety Information Sharing				P	2011													

Enabler Listing

EN-3121   Integrated Safety Assurance and Risk Management - Level 3

Description: Level 3 builds upon Level 2 successes. The aviation safety executive body expands where appropriate, including foreign partners, local authorities and special interest groups. Safety information sharing requirements are continuously refined by the executive body. Tools to forecast and manage safety risks are implemented. The aviation safety executive board continuously improves processes, techniques and tools used to expand the analysis of safety information and increase the confidence in the analytical processes system wide. System state information, including weather information, is fused with other sources to support Integrated Risk Management (IRM) activities.

SOPR: FAA   *Primary Supported OIs:* OI-3109

SOCR: *Primary Supported Enablers:*

Enabler Group: Safer Practices Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3121: Integrated Safety Assurance and Risk Management - Level 3								E 2015										
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-3120: Integrated Safety Assurance and Risk Management - Level 2							E 2014											

EN-3122   Reduced Controlled Flight into Terrain - Level 1

Description: Controlled Flight Into Terrain (CFIT) is reduced through incorporation and integration of synthetic vision technologies and world-wide geospatial databases. Situational awareness enhancements utilize database, sensor, and hazard (terrain, traffic - surface and airborne, etc.) detection technologies merged with display symbology and precise Global Positioning System (GPS) navigational information to create synthetic views of the aircraft's external environment for display to the flight crew. Regional databases and integrity monitoring technologies provide (acquire, verify, and maintain) worldwide geospatial databases suitable for synthetic vision applications.

SOPR: Industry   *Primary Supported OIs:* OI-3103

SOCR: *Primary Supported Enablers:* EN-3124

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3122: Reduced Controlled Flight into Terrain - Level 1								E 2015										
R-1260: Applied Research on Risk-reducing Systems Interfaces, Procedures, and Training						R 2013												
R-2121: Applied Research of Human Performance Models						R 2013												
R-2130: Applied Research on Risk-Reducing Systems Interfaces, Procedures, and Training						R 2013												
R-2138: Applied Research on Human Error Using Automated Systems						R 2013												
D-1710: Risk Reducing Interfaces, Procedures, and Training						D 2013												

EN-3123   Airborne Weather Information Technologies- Level 1

Description: Reduce weather-related incidents through equipage of aircraft with cockpit weather system technologies for enhanced situational awareness & decision-making. Aircraft are equipped with airborne weather reporting sensor technologies, weather information datalink systems technologies for ground-to-air dissemination, airborne weather reporting data link systems for air-to-ground and air-to-air dissemination, weather hazard detection, monitoring, warning, and alerting technologies for hazards including turbulence, icing, restrictions to visibility, volcanic ash, cross-winds, wind shear, etc.

SOPR: Industry   *Primary Supported OIs:* OI-3103

SOCR: *Primary Supported Enablers:* EN-3125

Enabler Group: Safer Systems Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3123: Airborne Weather Information Technologies- Level 1																	2025	E
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-5017: Airport Winter Operations Resource Management System - Level 1						E 2013												
EN-5022: Deicing/Anti-Icing Holdover Time Input to Flight Object								E 2015										
R-1260: Applied Research on Risk-reducing Systems Interfaces, Procedures, and Training																R 2023		
R-2121: Applied Research of Human Performance Models																R 2023		
R-2130: Applied Research on Risk-Reducing Systems Interfaces, Procedures, and Training																R 2023		
R-2138: Applied Research on Human Error Using Automated Systems																R 2023		
D-1710: Risk Reducing Interfaces, Procedures, and Training																D 2023		

EN-3124   Reduced Controlled Flight into Terrain - Level 2

Description: Level 2 builds upon Level 1 successes. Controlled Flight Into Terrain (CFIT) is reduced through incorporation and integration of next generation situational awareness enhancements. Situational awareness enhancements utilize database, sensor, and hazard (terrain, traffic - surface and airborne, etc.) detection technologies merged with display symbology and precise.

> *SOPR:* Industry   *Primary Supported OIs:* OI-3103
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3124: Reduced Controlled Flight into Terrain - Level 2																	2025	E
EN-3122: Reduced Controlled Flight into Terrain - Level 1								E 2015										
R-1260: Applied Research on Risk-reducing Systems Interfaces, Procedures, and Training																R 2023		
R-2121: Applied Research of Human Performance Models																R 2023		
R-2130: Applied Research on Risk-Reducing Systems Interfaces, Procedures, and Training																R 2023		
R-2138: Applied Research on Human Error Using Automated Systems																R 2023		
D-1710: Risk Reducing Interfaces, Procedures, and Training																D 2023		

EN-3125   Airborne Weather Information Technologies- Level 2

Description: Level 2 builds upon Level 1 successes. Reduce weather-related incidents through equipage of aircraft with next generation cockpit weather system technologies for enhanced situational awareness & decision-making. Aircraft are equipped with enhanced airborne weather reporting sensor technologies, weather information datalink systems technologies for ground-to-air dissemination, airborne weather reporting datalink systems for air-to-ground and air-to-air dissemination, weather hazard detection, monitoring, warning, and alerting technologies for hazards including turbulence, icing, restrictions to visibility, volcanic ash, cross-winds, wind shear, etc.

> *SOPR:* Industry   *Primary Supported OIs:* OI-3103
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3125: Airborne Weather Information Technologies- Level 2																	2025	E
EN-2810: Aircraft Systems - Turbulence Mitigation											E	2018						
EN-2830: Aircraft Systems - Low Visibility Alleviation											E	2018						
EN-2850: Aircraft Systems - Radiation Alleviation											E	2018						
EN-2860: Aircraft Systems - Volcanic Ash Alleviation											E	2018						
EN-2870: Aircraft Systems - Weather Mitigation Requirements											E	2018						
EN-5217: Airport Winter Operations Resource Management System - Level 2											E	2018						
EN-2682: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 3													E	2021				
EN-2030: NextGen 4-D Weather Cube Information - Level 3 Full NextGen														E	2022			
EN-3123: Airborne Weather Information Technologies- Level 1																	2025	E
R-1260: Applied Research on Risk-reducing Systems Interfaces, Procedures, and Training																R	2023	
R-2121: Applied Research of Human Performance Models																R	2023	
R-2130: Applied Research on Risk-Reducing Systems Interfaces, Procedures, and Training																R	2023	
R-2138: Applied Research on Human Error Using Automated Systems																R	2023	
D-1710: Risk Reducing Interfaces, Procedures, and Training																D	2023	

EN-3126   Improved Aircraft Upset Prevention and Recovery

Description: Upset prevention (prevention of uncommanded aircraft movements and unusual attitudes) and recovery are improved through equipage of aircraft with guidance and control countermeasures. Flight control systems are introduced to implement guidance and control measures for recovery from failure/loss-of-control conditions.

> *SOPR:* Industry   *Primary Supported OIs:* OI-3104
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3126: Improved Aircraft Upset Prevention and Recovery																	2025	E
R-1290: Applied Research for Upset Condition Prevention and Recovery																R	2023	

EN-3127   Reduce Airborne Icing-Related Incidents - Level 1

Description: Reduce icing-related incidents through equipage of aircraft with icing detection and avoidance technologies, and icing tolerant technologies. Improvements are needed in icing computational tools, icing experimental methods, icing experimental databases, icing atmospheric charterization technologies, and icing education and training tools.

> *SOPR:* Industry   *Primary Supported OIs:* OI-3104
>
> *SOCR:*   *Primary Supported Enablers:* EN-3128

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3127: Reduce Airborne Icing-Related Incidents - Level 1								E	2015									
EN-6006: Baseline of Required Water Pollution Mitigation Needs				E	2011													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E	2013											
EN-5017: Airport Winter Operations Resource Management System - Level 1						E	2013											
EN-5013: Runway Friction - Integrated Condition Reporting								E	2015									
EN-5021: Ground Based Non-Fluid De-Icing Technology								E	2015									
R-1290: Applied Research for Upset Condition Prevention and Recovery						R	2013											

Enabler Listing

EN-3128   Reduce Airborne Icing-Related Incidents - Level 2

Description: Reduce icing-related incidents through equipage of aircraft with icing detection and avoidance technologies, and icing tolerant technologies. Improvements are needed in icing computational tools, icing experimental methods, icing experimental databases, icing atmospheric charterization technologies, and icing education and training tools.

> *SOPR:* Industry   *Primary Supported OIs:* OI-3104
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3128: Reduce Airborne Icing-Related Incidents - Level 2																2025		E
EN-3127: Reduce Airborne Icing-Related Incidents - Level 1								E 2015										
EN-2820: Aircraft Systems - Icing Alleviation											E 2018							
EN-5020: Advanced De-Icing/Anti-Ice Fluids											E 2018							
EN-5217: Airport Winter Operations Resource Management System - Level 2											E 2018							
EN-5019: Aircraft Systems - Ground Icing Detection													E 2020					
EN-2030: NextGen 4-D Weather Cube Information - Level 3 Full NextGen															E 2022			
EN-5018: Aircraft Systems - De-Ice/Anti-Ice Technology																	2024 E	
R-1290: Applied Research for Upset Condition Prevention and Recovery																R 2023		

EN-3129   Harmonize Standards, Regulations and Procedures

Description: The risks of incidents and accidents are reduced worldwide through harmonization of U.S. standards, regulations, and procedures to comply with International Civil Aviation Organization (ICAO) Articles 37 and 12. The U.S. ensures that its interests are represented in the standards, regulations, and procedures ICAO promulgates through participating in Air Navigation meetings, Commission Panels, Study Groups, and Council Technical Committees. Harmonization reduces the number of exceptions to ICAO requirements, standardizes operations, and reduces the capital investment, maintenance, and training costs required of operators to operate internationally.

> *SOPR:* FAA   *Primary Supported OIs:* OI-3107
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Safer Worldwide Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3129: Harmonize Standards, Regulations and Procedures									E 2016									

EN-3130   Increased Crash Survivability - Aircraft Structures & Components

Description: Improve survivability in survivable accidents by minimizing crash loads and maintaining habitable volumes through introduction of improved energy absorbing seats, restraints, and aircraft structures.

> *SOPR:* Industry   *Primary Supported OIs:* OI-3104
>
> *SOCR:*   *Primary Supported Enablers:* EN-3064, EN-3065

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3130: Increased Crash Survivability - Aircraft Structures & Components								E 2015										
D-2171: Aircraft System Contributions to Survival in Crash Scenarios Design Guidelines						D 2013												

EN-3131   Increased Crash Survivability- Aircraft Fire Prevention & Suppression

Description: Crash survivability is improved through equipage of aircraft with fuel tank and cargo compartment fire prevention and fire suppression systems. Elevated flash point fuel is developed and used. Improvements in ground systems for accident detection, severity mitigation, and response is implemented.

> *SOPR:* Industry   *Primary Supported OIs:* OI-3104
>
> *SOCR:*   *Primary Supported Enablers:* EN-3064, EN-3065

Enabler Group: Safer Systems Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3131: Increased Crash Survivability- Aircraft Fire Prevention & Suppression								E 2015										
D-2171: Aircraft System Contributions to Survival in Crash Scenarios Design Guidelines						D 2013												

EN-3132   Reduce Ground Icing-Related Incidents - Level 1

Description: Icing incidents related to aircraft contamination that occurs while the aircraft is on the ground are deemed ground icing incidents. This includes failure to deice aircraft, failure to meet departure requirements associated with deicing operations holdover times, sensor failures or faults, etc. Improved decision aids, weather, and environmental enablers support improvements in operations that reduce ground icing incident potential. Level 1 focuses on near- to mid-term weather and environmental products.

         SOPR: Industry   ***Primary Supported OIs:*** OI-3105

         SOCR: ***Primary Supported Enablers:*** EN-3133

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3132: Reduce Ground Icing-Related Incidents - Level 1								E 2015										
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-5017: Airport Winter Operations Resource Management System - Level 1						E 2013												
EN-5021: Ground Based Non-Fluid De-Icing Technology								E 2015										
EN-5022: Deicing/Anti-Icing Holdover Time Input to Flight Object								E 2015										

EN-3133   Reduce Ground Icing-Related Incidents - Level 2

Description: Icing incidents related to aircraft contamination that occurs while the aircraft is on the ground are deemed ground icing incidents. This includes failure to deice aircraft, failure to meet departure requirements associated with deicing operations holdover times, sensor failures or faults, etc. Improved decision aids, weather, and environmental enablers support improvements in operations that reduce ground icing incident potential. Level 2 focuses on mid- to far-term weather and environmental products.

         SOPR: Industry   ***Primary Supported OIs:*** OI-3105

         SOCR: ***Primary Supported Enablers:***

Enabler Group: Safer Systems Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-3133: Reduce Ground Icing-Related Incidents - Level 2																	2025	E
EN-3132: Reduce Ground Icing-Related Incidents - Level 1								E 2015										
EN-2820: Aircraft Systems - Icing Alleviation										E 2018								
EN-5016: Ice-Resistant Pavement Surfaces										E 2018								
EN-5217: Airport Winter Operations Resource Management System - Level 2											E 2018							
EN-2030: NextGen 4-D Weather Cube Information - Level 3 Full NextGen															E 2022			

EN-4106   Checkpoint Screening Technology - CBRNE and Weapons

Description: Develop comprehensive screening for Chemical, Biological, Radiological, Nuclear, and High Yield Explosive (CBRNE) and weapons screening.

         SOPR: DHS   ***Primary Supported OIs:*** OI-4105

         SOCR: ***Primary Supported Enablers:*** EN-4108, EN-4116

Enabler Group: Screening Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4106: Checkpoint Screening Technology - CBRNE and Weapons									E 2016									
D-2111: Threat Detection and Screening Technologies						D 2014												
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															
PI-0096: Security Financing Responsibility for Passenger and Cargo Screening			P 2010															

Enabler Listing

EN-4107 Checkpoint Screening Technology - Enhance Passenger Screening Throughput

Description: Checkpoint screening systems capable of processing passenger volumes at twice the current rate with fewer screeners.

SOPR: DHS   *Primary Supported OIs:* OI-4105

SOCR: *Primary Supported Enablers:*

Enabler Group: Screening Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4107: Checkpoint Screening Technology - Enhance Passenger Screening Throughput				E 2011														
EN-4119: Biometrics and Credential Standards with Airport Access Focus		E 2009																
D-2111: Threat Detection and Screening Technologies		D 2009																
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															
PI-0096: Security Financing Responsibility for Passenger and Cargo Screening			P 2010															

EN-4108 Checkpoint Screening Technology - Integrated Screening System

Description: Advanced Checkpoint Screening system that contains multiple technologies and can enhance the type of detection screening required for particular threats.

SOPR: DHS   *Primary Supported OIs:* OI-4107

SOCR: *Primary Supported Enablers:*

Enabler Group: Screening Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4108: Checkpoint Screening Technology - Integrated Screening System										E 2017								
EN-4205: BPR Technology and Procedures				E 2011														
EN-4106: Checkpoint Screening Technology - CBRNE and Weapons									E 2016									
D-2111: Threat Detection and Screening Technologies								D 2015										
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															
PI-0096: Security Financing Responsibility for Passenger and Cargo Screening			P 2010															

EN-4109 Checkpoint Screening Technology - Reduction and Improved False Alarm Resolution

Description: Individual integrated combined technology explosives and weapons screening systems to provide for Level 1 and Level 2 screening. Level 2 screening is used to clear alarms from Level 1.

SOPR: DHS   *Primary Supported OIs:* OI-4105

SOCR: *Primary Supported Enablers:*

Enabler Group: Screening Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4109: Checkpoint Screening Technology - Reduction and Improved False Alarm Resolution				E 2012														
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															
PI-0096: Security Financing Responsibility for Passenger and Cargo Screening			P 2010															

EN-4110 Checkpoint Screening Technology - Optimize Screening Infrastructure Requirements

Description: Optimize the amount of physical airport terminal space required for checkpoint screening. Reduce the overall footprint of the screening equipment requirements. These two together will provide for increased screening capability and an increase in the processing of passengers.

SOPR: DHS   *Primary Supported OIs:* OI-4105

SOCR: *Primary Supported Enablers:* EN-5026

Enabler Group: Screening Enablers

Enabler Listing																		

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4110: Checkpoint Screening Technology - Optimize Screening Infrastructure Requirements								E 2015										
R-0700: Applied Research on Efficient Screening Checkpoint Design Models						R 2013												

EN-4113   Passenger Checkpoint Screening - Requirements

Description: Establish National Security Performance Requirements and Standards for the screening of passengers and carry on luggage.

       SOPR: DHS   *Primary Supported OIs:* OI-4105, OI-4300, OI-5015

       SOCR: *Primary Supported Enablers:* EN-4118, EN-4120, EN-4121

Enabler Group: Screening Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4113: Passenger Checkpoint Screening - Requirements			E 2010															
EN-4114: Passenger Checkpoint Screening - National Standards			E 2010															
PI-0079: Global Security			P 2010															
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															

EN-4114   Passenger Checkpoint Screening - National Standards

Description: Establish National Security Performance Requirements and Standards for the screening of passengers and carryon luggage.

       SOPR: DHS   *Primary Supported OIs:*

       SOCR: *Primary Supported Enablers:* EN-4113

Enabler Group: Screening Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4114: Passenger Checkpoint Screening - National Standards			E 2010															
PI-0079: Global Security			P 2010															
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															

EN-4116   Off Airport Passenger and Baggage Security Screening (RTSS)

Description: Reduce the number of passengers and carry-on baggage screened at airport terminal buildings by screening passengers at locations remote from the airport terminal building and transporting them securely to the boarding area.

       SOPR: Industry   *Primary Supported OIs:* OI-4105, OI-4300, OI-5015

       SOCR: *Primary Supported Enablers:*

Enabler Group: Screening Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4116: Off Airport Passenger and Baggage Security Screening (RTSS)									E 2016									
EN-1274: NextGen Security Information Services - DHS Group 1					E 2012													
EN-4403: Secure Supply Chain Entity						E 2013												
EN-4106: Checkpoint Screening Technology - CBRNE and Weapons									E 2016									
EN-4118: Checkpoint Screening Technology - Threat Containment									E 2016									
R-1390: Applied Research on Off-Airport Passenger and Baggage Processing							R 2014											
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															
PI-0081: Perimeter Security					P 2012													
PI-0074: General Aviation Airport Security Requirements						P 2013												

Enabler Listing

EN-4118   Checkpoint Screening Technology - Threat Containment

Description: Provide for threat containment devices at checkpoints.

    SOPR: DHS   *Primary Supported OIs:* OI-4105

    SOCR: *Primary Supported Enablers:* EN-4116

Enabler Group: Screening Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4118: Checkpoint Screening Technology - Threat Containment									E 2016									
EN-4113: Passenger Checkpoint Screening - Requirements			E 2010															
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															
PI-0096: Security Financing Responsibility for Passenger and Cargo Screening			P 2010															

EN-4119   Biometrics and Credential Standards with Airport Access Focus

Description: Published biometrics and credential standards for people security.

    SOPR: DHS   *Primary Supported OIs:*

    SOCR: *Primary Supported Enablers:* EN-4107, EN-4120, EN-4201, EN-4204

Enabler Group: Airport Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4119: Biometrics and Credential Standards with Airport Access Focus		E 2009																

EN-4120   Integrated Passenger Screening, Credentialing and Risk Management System - Level 1

Description: The vetting system has a vetting platform that utilizes smart name matching algorithms to check against watch lists in order to identify high risk passengers on commercial flights. High risk passengers are further categorized to different risk levels: no-fly and selectees. The former cannot board while the latter will receive more screening attention at the checkpoint. Some airports have the Registered Travelers (RT) program that collects travelers' biometrics and issues credentials such that RT travelers can be verified at the checkpoint. These travelers have privileges at the airport including priority screening at the checkpoint.

    SOPR: DHS   *Primary Supported OIs:* OI-4101

    SOCR: *Primary Supported Enablers:* EN-4121

Enabler Group: Screening Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4120: Integrated Passenger Screening, Credentialing and Risk Management System - Level 1					E 2012													
EN-4119: Biometrics and Credential Standards with Airport Access Focus		E 2009																
EN-4113: Passenger Checkpoint Screening - Requirements			E 2010															
EN-1240: NextGen Enterprise Network - DHS				E 2011														
EN-1254: Information Sharing Standards: Security Information					E 2012													
PI-0080: Screening Requirement For Meeters And Greeters			P 2010															

EN-4121   Integrated Passenger Screening, Credentialing and Risk Management System - Level 2

Description: The vetting system has a vetting platform that utilizes enhanced name matching algorithms to check against watch lists in order to identify high risk passengers for commercial flights. High risk passengers are further categorized to different risk levels: no-fly and selectees. The former cannot board while the latter will receive more screening attention at the checkpoint. The vetting system is integrated with airlines passenger processing system. All major airports in the US have the Registered Travelers (RT) program that collects travelers' biometrics and issues credentials such that RT travelers can be verified at the checkpoint. These travelers have privileges at the airport including faster screening at the checkpoint.

    SOPR: DHS   *Primary Supported OIs:* OI-4106

    SOCR: *Primary Supported Enablers:*

Enabler Group: Screening Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4121: Integrated Passenger Screening, Credentialing and Risk Management System - Level 2					E 2012													
EN-4113: Passenger Checkpoint Screening - Requirements				E 2010														
EN-1274: NextGen Security Information Services - DHS Group 1					E 2012													
EN-4120: Integrated Passenger Screening, Credentialing and Risk Management System - Level 1					E 2012													

EN-4201   Airport Surveillance, Tracking and Detection System - Level 1

Description: Perimeter breach or threat detection systems able to detect a threat presence movement (unauthorized person/vehicle/object) tag and track in all weather and day/night. This system will transmit the information to an airport operations center and maintain situational awareness on the threat object until intercepted by a Law Enforcement Organization (LEO) or otherwise resolved.

> *SOPR:* Airport Operator   *Primary Supported OIs:* OI-4103, OI-4201, OI-4203, OI-4204
>
> *SOCR:*   *Primary Supported Enablers:* EN-4250

Enabler Group: Airport Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4201: Airport Surveillance, Tracking and Detection System - Level 1							E 2014											
EN-4119: Biometrics and Credential Standards with Airport Access Focus			E 2009															
EN-1406: Airport Surveillance Video				E 2010														
EN-4210: Airport Command, Control, and Communications Center Architecture				E 2010														
D-2111: Threat Detection and Screening Technologies						D 2012												
D-0970: Real-Time Airport Intruder Identification and Tracking System						D 2012												
PI-0009: National Integrated Surveillance Plan	P 2008																	
PI-0081: Perimeter Security					P 2012													
PI-0091: Airport Worker Vetting						P 2013												

EN-4202   Integrated and Secure Airport Voice/Data Network

Description: A system to provide secure/encrypted data streaming to various users at different SSI/classified levels - intra-governmental and non-governmental.

> *SOPR:* DHS   *Primary Supported OIs:* OI-4201
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Airport Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4202: Integrated and Secure Airport Voice/Data Network						E 2012												
EN-4210: Airport Command, Control, and Communications Center Architecture				E 2010														
EN-1015: Enterprise Network Management Standards						E 2011												
EN-1016: Enterprise Networks Infrastructure Services Standards						E 2011												
EN-1043: Enterprise Networks Security Services Standards						E 2011												
EN-4203: Multi-Agency Security Information Sharing/Delegation Protocols						E 2011												
PI-0009: National Integrated Surveillance Plan	P 2008																	

EN-4203   Multi-Agency Security Information Sharing/Delegation Protocols

Description: National, Regional, State and inter-airport connectivity on classified/protected systems - policy/procedures to allow disparate users access where needed.

> *SOPR:* DHS   *Primary Supported OIs:* OI-4201
>
> *SOCR:*   *Primary Supported Enablers:* EN-4202, EN-4206

Enabler Group: Airport Security Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4203: Multi-Agency Security Information Sharing/Delegation Protocols				E 2011														
EN-4210: Airport Command, Control, and Communications Center Architecture			E 2010															
D-0460: Enterprise Airport Security Data Management System			D 2009															
PI-0009: National Integrated Surveillance Plan	P 2008																	
PI-0024: Secure Information Exchange	P 2008																	

EN-4204   Transportation Worker Identification Credentialing /Access Control/Tracking System

Description: Transportation Worker Identification Credential is a worker vetting and credentialing program. Airports have access control that workers can only gain access if their identity has been verified. Passive and active tracking mechanisms which track employees to ensure the worker only accesses those areas they are authorized to access.

> *SOPR:* DHS   *Primary Supported OIs:* OI-4103, OI-4201, OI-4203
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Airport Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4204: Transportation Worker Identification Credentialing /Access Control/Tracking System						E 2013												
EN-4119: Biometrics and Credential Standards with Airport Access Focus		E 2009																
EN-1406: Airport Surveillance Video			E 2010															
EN-4210: Airport Command, Control, and Communications Center Architecture			E 2010															
EN-4205: BPR Technology and Procedures				E 2011														
D-2111: Threat Detection and Screening Technologies				D 2011														
D-0970: Real-Time Airport Intruder Identification and Tracking System				D 2011														
PI-0081: Perimeter Security					P 2012													
PI-0091: Airport Worker Vetting						P 2013												

EN-4205   BPR Technology and Procedures

Description: Behavioral Pattern Recognition (BPR) automated system that enhances human-observation methods to detect anomalies in behavior and alerts to potential threats.

> *SOPR:* DHS   *Primary Supported OIs:* OI-4103, OI-4105, OI-4201, OI-4203
>
> *SOCR:*   *Primary Supported Enablers:* EN-4108, EN-4204

Enabler Group: Screening Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4205: BPR Technology and Procedures				E 2011														
D-2111: Threat Detection and Screening Technologies			D 2009															
D-0970: Real-Time Airport Intruder Identification and Tracking System			D 2009															
PI-0080: Screening Requirement For Meeters And Greeters			P 2010															

EN-4206   National Airport Emergency Response Protocol/Policies/Procedures

Description: Emergency/contingency response training and certification at airports to seamlessly respond to disaster or emergency in a fashion that interfaces with regional or national response policy, plans and procedures.

> *SOPR:* DHS   *Primary Supported OIs:* OI-4204
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Airport Security Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4206: National Airport Emergency Response Protocol/Policies/Procedures					E 2012													
EN-4210: Airport Command, Control, and Communications Center Architecture			E 2010															
EN-4203: Multi-Agency Security Information Sharing/Delegation Protocols				E 2011														
PI-0097: Airport Emergency Response					P 2012													

EN-4208   Airport CBRNE Detection Systems

Description: Tactical systems easily deployable in airport Heating, Ventilation, and Air-conditioning (HVAC) systems to detect Comprehensive Chemical, Biologic, Radiological, Nuclear, and Explosives (CBRNE) threats and trigger system isolation.

      SOPR: DHS   *Primary Supported OIs:* OI-4203

      SOCR: *Primary Supported Enablers:*

Enabler Group: Airport Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4208: Airport CBRNE Detection Systems								E 2015										
EN-4210: Airport Command, Control, and Communications Center Architecture			E 2010															
D-2111: Threat Detection and Screening Technologies						D 2013												
PI-0096: Security Financing Responsibility for Passenger and Cargo Screening			P 2010															

EN-4210   Airport Command, Control, and Communications Center Architecture

Description: Develop system architecture design for airport Command, Control and Communications (C3) facilities that complies with government security and data protocols for classified information exchange.

      SOPR: Industry   *Primary Supported OIs:*

      SOCR: *Primary Supported Enablers:* EN-4201, EN-4202, EN-4203, EN-4204, EN-4206, EN-4208, EN-4522

Enabler Group: Airport Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4210: Airport Command, Control, and Communications Center Architecture			E 2010															
D-0460: Enterprise Airport Security Data Management System	D 2008																	
PI-0024: Secure Information Exchange	P 2008																	
PI-0108: Certifying Use of Net-Centric Information	P 2008																	

EN-4250   Airport Surveillance, Tracking and Detection System - Level 2

Description: Perimeter breach or threat detection systems able to detect a threat movement (unauthorized person/vehicle) tag and track in all weather and day/night. This system will transmit the information to an airport operations center and supporting Law Enforcement Organizations (LEO) while maintaining situational awareness on the threat object until intercepted by LEO or otherwise resolved.

      SOPR: DHS   *Primary Supported OIs:* OI-4202

      SOCR: *Primary Supported Enablers:*

Enabler Group: Airport Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4250: Airport Surveillance, Tracking and Detection System - Level 2													E 2020					
EN-4201: Airport Surveillance, Tracking and Detection System - Level 1							E 2014											
D-2111: Threat Detection and Screening Technologies												D 2018						
D-0970: Real-Time Airport Intruder Identification and Tracking System												D 2018						

Enabler Listing

EN-4301   Baggage/Cargo Screening Technology - CBRNE and Weapons

Description: Baggage and cargo are screened for Chemical, Biological, Radiological, Nuclear, and High Yield Explosive (CBRNE) threat materials intended to destroy or disable the aircraft or Air Transportation System (ATS).

SOPR: DHS	*Primary Supported OIs:* OI-4300, OI-4401
SOCR:	*Primary Supported Enablers:* EN-4307

Enabler Group: Baggage/Cargo/Mail Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4301: Baggage/Cargo Screening Technology - CBRNE and Weapons							E 2014											
D-2111: Threat Detection and Screening Technologies					D 2012													
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															
PI-0096: Security Financing Responsibility for Passenger and Cargo Screening			P 2010															
PI-0099: Air Cargo and Mail Security Requirements			P 2010															
PI-0074: General Aviation Airport Security Requirements						P 2013												

EN-4302   Baggage/Cargo Screening Technology - Increased Effectiveness

Description: Provides decreased levels of false alarm, higher baggage throughput, and smaller, lighter, and lower cost detection equipment. It would also provide for screening through the use of systems designed multi technology screening systems to clear alarms faster and for alternative screening concepts for airports processing a lower volume of passengers.

SOPR: DHS	*Primary Supported OIs:* OI-4403
SOCR:	*Primary Supported Enablers:* EN-4307

Enabler Group: Baggage/Cargo/Mail Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4302: Baggage/Cargo Screening Technology - Increased Effectiveness								E 2015										
D-2111: Threat Detection and Screening Technologies						D 2013												
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															
PI-0096: Security Financing Responsibility for Passenger and Cargo Screening			P 2010															
PI-0099: Air Cargo and Mail Security Requirements			P 2010															

EN-4307   Baggage/Cargo Screening Technology - Integrated Screening System

Description: Baggage and cargo received from, other than from a Certified Supply Chain Entity (CSCE) via the Secure Supply Chain Entity (SSCE), requires screening prior to entry and tracked throughout the air transportation secure system for Chemical, Biological, Radiological, Nuclear, and High Yield Explosive (CBRNE) threat material. The improvement provides for detection and decreased levels of false alarm, higher cargo throughput, higher levels of threat detection, and smaller, lighter, and lower costs detection equipment. It provides screening through the use of systems designed multi technology screening systems to clear alarms faster, as well as and for alternative screening concepts for airports processing a lower volume of baggage and cargo.

SOPR: DHS	*Primary Supported OIs:* OI-4301, OI-4403
SOCR:	*Primary Supported Enablers:*

Enabler Group: Baggage/Cargo/Mail Security Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4307: Baggage/Cargo Screening Technology - Integrated Screening System									E 2016									
EN-4310: Cargo & Mail Screening - Requirements				E 2011														
EN-4312: Baggage/Cargo Screening Technology - Threat Containment						E 2013												
EN-4403: Secure Supply Chain Entity						E 2013												
EN-4301: Baggage/Cargo Screening Technology - CBRNE and Weapons							E 2014											
EN-4302: Baggage/Cargo Screening Technology - Increased Effectiveness								E 2015										
D-2111: Threat Detection and Screening Technologies							D 2014											
D-0710: Baggage/Cargo/Mail Monitoring System							D 2014											
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															
PI-0096: Security Financing Responsibility for Passenger and Cargo Screening			P 2010															
PI-0099: Air Cargo and Mail Security Requirements			P 2010															
PI-0074: General Aviation Airport Security Requirements						P 2013												

EN-4310   Cargo & Mail Screening - Requirements

Description: Establish National Security Performance Requirements for the screening of cargo and mail.

SOPR: DHS   *Primary Supported OIs:* OI-4300

SOCR: *Primary Supported Enablers:* EN-4307, EN-4401, EN-4403

Enabler Group: Baggage/Cargo/Mail Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4310: Cargo & Mail Screening - Requirements				E 2011														
EN-4311: Cargo & Mail Screening - National Standards			E 2010															
PI-0079: Global Security			P 2010															
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															
PI-0096: Security Financing Responsibility for Passenger and Cargo Screening			P 2010															
PI-0099: Air Cargo and Mail Security Requirements			P 2010															

EN-4311   Cargo & Mail Screening - National Standards

Description: Establish National Security Performance Standards for the screening of cargo and mail.

SOPR: DHS   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-4310

Enabler Group: Baggage/Cargo/Mail Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4311: Cargo & Mail Screening - National Standards			E 2010															
R-1000: Applied Research on Efficient Baggage Screening Design Models	R 2008																	
PI-0079: Global Security			P 2010															
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															
PI-0096: Security Financing Responsibility for Passenger and Cargo Screening			P 2010															
PI-0099: Air Cargo and Mail Security Requirements			P 2010															

EN-4312   Baggage/Cargo Screening Technology - Threat Containment

Description: The availability of threat containment vessels within and adjacent to baggage screening and alarm resolution equipment.

SOPR: Industry   *Primary Supported OIs:* OI-4300, OI-4401

SOCR: *Primary Supported Enablers:* EN-4307

Enabler Group: Baggage/Cargo/Mail Security Enablers

Enabler Listing																		

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4312: Baggage/Cargo Screening Technology - Threat Containment						E 2013												
PI-0095: National Security Policies for Passenger and Cargo Screening			P 2010															
PI-0096: Security Financing Responsibility for Passenger and Cargo Screening			P 2010															
PI-0099: Air Cargo and Mail Security Requirements			P 2010															

EN-4401   Certified Supply Chain Entity

Description: The Certified Supply Chain Entity (CSCE) Program requirements for cargo/mail and prevents the introduction of threat material though that vector into the Air Transportation System (ATS). Cargo/Mail is shipped through a CSCE that includes vetted cargo packers, sterile cargo packing areas, a verified chain of custody, and tamper resistant/alerting technology reducing the requirements to further screen cargo/mail.

> *SOPR:* Industry   *Primary Supported OIs:* OI-4400
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Baggage/Cargo/Mail Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4401: Certified Supply Chain Entity						E 2013												
EN-4310: Cargo & Mail Screening - Requirements					E 2011													
D-0440: Secure and Certified Supply Chain Entity					D 2011													
PI-0100: Certified Supply Chain Entity (CSCE)						P 2013												

EN-4403   Secure Supply Chain Entity

Description: The Secure Supply Chain Entity (SSCE) ensures all Cargo/Mail is identified and is capable of being tracked through the air transportation system. Cargo Identification and Tracking reduces the risk of the introduction of threat material and provides tampering alerting. Positive identification and tracking information provides law enforcement agencies with the ability through a network enabled organization to identify critical information on cargo/mail to include shipper, screening methods, points of origin and destination, and location in the Air Transportation System (ATS).

> *SOPR:* Industry   *Primary Supported OIs:* OI-4400, OI-4401
>
> *SOCR:*   *Primary Supported Enablers:* EN-4116, EN-4307

Enabler Group: Baggage/Cargo/Mail Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4403: Secure Supply Chain Entity						E 2013												
EN-4310: Cargo & Mail Screening - Requirements					E 2011													
D-0440: Secure and Certified Supply Chain Entity					D 2011													
PI-0099: Air Cargo and Mail Security Requirements			P 2010															
PI-0074: General Aviation Airport Security Requirements						P 2013												

EN-4500   Flight Risk Management System - Level 1 Static

Description: A capability that synthesizes static security-relevant data to assess the risk profile of flights. Once identified, risk flights are notified to the security stakeholders on their display systems. In addition, the system has collaboration capabilities that the Air Navigation Service Provider/Security Service Provider/Defense Service Provider (ANSP/SSP/DSP) can coordinate and share information. Security activities and events are automatically logged and shared with stakeholders. All stakeholders have shared situational awareness with common surveillance data.

> *SOPR:* DHS   *Primary Supported OIs:* OI-4500
>
> *SOCR:*   *Primary Supported Enablers:* EN-4520

Enabler Group: Airspace Security Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4500: Flight Risk Management System - Level 1 Static					E	2012												
EN-1240: NextGen Enterprise Network - DHS				E	2011													
EN-1254: Information Sharing Standards: Security Information					E	2012												
D-0030: Planning, Collaboration, and Coordination Functions for Airspace Security			D	2010														
D-1560: Flight Risk Assessment Algorithms			D	2010														
PI-0009: National Integrated Surveillance Plan	P	2008																
PI-0098: Non-Cooperative Target Support			P	2010														

EN-4510 Security Airspace Planning and Management - Level 1

Description: A capability that facilitates the design and the creation of the airspace volume and associated security constraints (volumetric expression, access criteria and time intervals) to minimize overall airspace system impact. In addition, security airspace advisories are distributed with an improved Notice to Airmen (NOTAM) system. Airspace Waivers process and capabilities are in place.

SOPR: FAA   *Primary Supported OIs:* OI-4501

SOCR: *Primary Supported Enablers:* EN-4511, EN-4522

Enabler Group: Airspace Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4510: Security Airspace Planning and Management - Level 1					E	2012												
EN-1240: NextGen Enterprise Network - DHS				E	2011													
EN-1254: Information Sharing Standards: Security Information					E	2012												
EN-1274: NextGen Security Information Services - DHS Group 1					E	2012												
D-0030: Planning, Collaboration, and Coordination Functions for Airspace Security			D	2010														
PI-0110: International Commercial Space Operations				P	2011													

EN-4511 Security Airspace Planning and Management - Level 2

Description: A capability that facilitates the design and the creation of the airspace volume and their associated security constraints (volumetric expression, access criteria and time intervals) in order to minimize overall national airspace system impact. In addition, security airspace advisories are distributed with an enhanced digital Notice to Airmen (NOTAM) system that gives users better interface. Airspace Waivers process and capabilities are integrated with the flight risk management system.

SOPR: FAA   *Primary Supported OIs:* OI-4511

SOCR: *Primary Supported Enablers:* EN-4512

Enabler Group: Airspace Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4511: Security Airspace Planning and Management - Level 2							E	2014										
EN-4510: Security Airspace Planning and Management - Level 1					E	2012												
D-0030: Planning, Collaboration, and Coordination Functions for Airspace Security					D	2012												

EN-4512 Security Airspace Planning and Management - Level 3

Description: A capability that facilitates the design and the creation of the airspace volume and their associated security constraints (volumetric expressions, access criteria and time intervals) in order to minimize overall national airspace system impact. The airspace access criteria are based on specific flight risk. Security airspace advisories are distributed directly to the cockpit. Security Airspace Planning and Management (SAPM) is integrated with the Flight Risk Management System (FRMS).

SOPR: FAA   *Primary Supported OIs:* OI-4512

SOCR: *Primary Supported Enablers:*
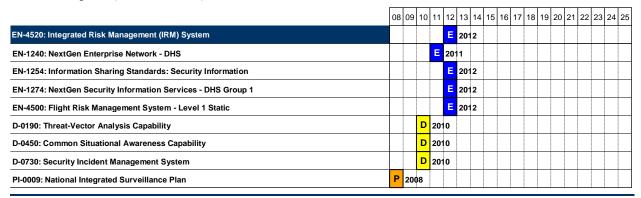
Enabler Group: Airspace Security Enablers

Enabler Listing																		

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4512: Security Airspace Planning and Management - Level 3																	2025	E
EN-1252: Information Sharing Standards: Airspace Information			E 2010															
EN-4511: Security Airspace Planning and Management - Level 2							E 2014											
EN-1170: Integrated Ground and Air Network for Voice/Data																	2025	E
D-0030: Planning, Collaboration, and Coordination Functions for Airspace Security																D 2023		
PI-0009: National Integrated Surveillance Plan	P 2008																	

EN-4520   Integrated Risk Management (IRM) System

Description: A capability that consists of risk management process with quantitative tools and measures support to decision-making in investment strategies, asset/resource allocation and prioritization, and policy/procedure changes

  SOPR: DHS *Primary Supported OIs:* OI-4520

  SOCR: *Primary Supported Enablers:* EN-4522

Enabler Group: Integrated Risk Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4520: Integrated Risk Management (IRM) System					E 2012													
EN-1240: NextGen Enterprise Network - DHS				E 2011														
EN-1254: Information Sharing Standards: Security Information					E 2012													
EN-1274: NextGen Security Information Services - DHS Group 1					E 2012													
EN-4500: Flight Risk Management System - Level 1 Static					E 2012													
D-0190: Threat-Vector Analysis Capability			D 2010															
D-0450: Common Situational Awareness Capability			D 2010															
D-0730: Security Incident Management System			D 2010															
PI-0009: National Integrated Surveillance Plan	P 2008																	

EN-4521   Flight Risk Management System - Level 2 Dynamic

Description: A capability that synthesizes static security-relevant data and dynamic flight object behavior data (both Air Traffic Management (ATM) Four Dimensional Trajectory (4DT) and security-relevant elements) to assess the risk profile of flights. Once identified, risk flights are notified to the security stakeholders on their display systems. The system has decision support capabilities to assist in risk prediction, event correlation, and security measure impact analysis. In addition, the system has collaboration capabilities that the Air Navigation Service Provider/Security Service Provider/Defense Service Provider (ANSP/SSP/DSP) can coordinate and share information. Furthermore, all stakeholders have shared situational awareness with geo-spatial visualization.

  SOPR: DHS *Primary Supported OIs:* OI-4502

  SOCR: *Primary Supported Enablers:*

Enabler Group: Airspace Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4521: Flight Risk Management System - Level 2 Dynamic									E 2016									
EN-1274: NextGen Security Information Services - DHS Group 1					E 2012													
EN-0002: Network-Enabled Flight Object Information							E 2014											
D-0030: Planning, Collaboration, and Coordination Functions for Airspace Security							D 2014											
D-1560: Flight Risk Assessment Algorithms							D 2014											
PI-0009: National Integrated Surveillance Plan	P 2008																	

Enabler Listing

EN-4522   Unified National Aviation Command, Control and Communication Architecture

Description: A federated set of operations centers of Air Navigation Service Providers (ANSPs), security/defense service providers, airports, other stakeholders that have command, control, communication structure, infrastructure, resources and assets that provide integrated security incident management

SOPR: DHS   *Primary Supported OIs:* OI-4521

SOCR: *Primary Supported Enablers:*

Enabler Group: Integrated Risk Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4522: Unified National Aviation Command, Control and Communication Architecture													E 2020					
EN-4210: Airport Command, Control, and Communications Center Architecture			E 2010															
EN-4510: Security Airspace Planning and Management - Level 1					E 2012													
EN-4520: Integrated Risk Management (IRM) System					E 2012													
EN-1511: Integrated Surveillance Information Service Level 3													E 2020					
D-0460: Enterprise Airport Security Data Management System											D 2018							
D-0730: Security Incident Management System											D 2018							
PI-0009: National Integrated Surveillance Plan	P 2008																	

EN-4600   Aircraft Security Systems and Policies

Description: On-board systems capable of monitoring the cabin, cockpit, and cargo compartment with video and Chemical, Biological, Radiological, Nuclear, and High Yield Explosive (CBRNE) detection capability and relaying the information to both on board and external monitoring systems

SOPR: DHS   *Primary Supported OIs:* OI-4600

SOCR: *Primary Supported Enablers:*

Enabler Group: Aircraft Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4600: Aircraft Security Systems and Policies									E 2016									
D-1180: Aircraft Explosives Detection and Mitigation							D 2014											
PI-0072: Use of Unmanned Aircraft for Security Missions					P 2012													

EN-4601   Aircraft Hijack/Unauthorized Diversion Technologies and Procedures

Description: Aircraft systems that reduce the possibility of hijacking or unauthorized diversion of the aircraft or UAS through the means of force or coercion

SOPR: DHS   *Primary Supported OIs:* OI-4600

SOCR: *Primary Supported Enablers:*

Enabler Group: Aircraft Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4601: Aircraft Hijack/Unauthorized Diversion Technologies and Procedures					E 2012													
PI-0021: Protection of Data Shared Over-The-Air		P 2009																
PI-0072: Use of Unmanned Aircraft for Security Missions					P 2012													

EN-4602   Aircraft Threat Containment and Survivability Hardening

Description: Aircraft systems that provide for survivability through critical component hardening and redundant flight control capability.

SOPR: DHS   *Primary Supported OIs:* OI-4600

SOCR: *Primary Supported Enablers:*

Enabler Group: Aircraft Security Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4602: Aircraft Threat Containment and Survivability Hardening					E 2012													
D-1180: Aircraft Explosives Detection and Mitigation			D 2010															
PI-0071: Defense System Standards - Global Harmonization					P 2012													

EN-4610   Aircraft External Threat Defense/Mitigation Systems

Description: On-board and ground based systems to reduce and/or mitigate the threat from LASERS, Man-Portable Air Defense System (MANPADS), directed energy or Electronic Pulse Threats (EMP) against aircraft/ Unmanned Aerial System (UAS).

> *SOPR:* DHS   *Primary Supported OIs:* OI-4601
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Aircraft Security Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-4610: Aircraft External Threat Defense/Mitigation Systems										E 2017								
D-1320: Missile Defense Systems for Commercial Aircraft								D 2015										
PI-0071: Defense System Standards - Global Harmonization					P 2012													

EN-5000   Airport Advocacy Program

Description: Community understanding and support for airports will be enhanced through outreach and advocacy programs. The program will be available to all airports. The primary focus will be on airports deemed to be critical to capacity; e.g., General Aviation and Reliever airports (as listed in the National Plan of Integrated Airport Systems (NPIAS) that are in regions with congested commercial service airports. Programs, tools, best management practices, appropriate funding, and policies will facilitate airport advocacy.

> *SOPR:* FAA   *Primary Supported OIs:* OI-5000
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Airport Advocacy and System Planning Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5000: Airport Advocacy Program						E 2013												
PI-0036: Airport Advocacy Program						P 2013												

EN-5001   Airport-Compatible Land Use

Description: Effective, comprehensive land use controls protect critical airports from encroachment of non-compatible uses while also protecting nearby residents from impacts. As states and some localities have the authority to make land use decisions, this program would be implemented at the local level. Federal Aviation Administration (FAA) would provide national guidance for land use compatibility guidelines.

> *SOPR:* FAA   *Primary Supported OIs:* OI-5000
> *SOCR:*   *Primary Supported Enablers:* EN-5032

Enabler Group: Airport Advocacy and System Planning Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5001: Airport-Compatible Land Use						E 2013												
PI-0047: Role of Federal Government in Conversion of Former Military Air Bases to Civil Aviation					P 2012													
PI-0048: Airport Preservation					P 2012													
PI-0037: Airport-Compatible Land Use						P 2013												

Enabler Listing

EN-5003   Obstruction Measurement and Evaluation Process

Description: Robust obstruction reporting and evaluation process protects flight paths from tall structures that diminish aviation safety, aircraft weight/lift capability, and reduce airport access during low ceiling/visibility conditions. Data supports the AIEM.

> *SOPR:* FAA   *Primary Supported OIs:* OI-5000
> *SOCR:*   *Primary Supported Enablers:* EN-5032

Enabler Group: Airport Advocacy and System Planning Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5003: Obstruction Measurement and Evaluation Process							E 2014											
EN-5036: NetCentric Airport Information Standards				E 2011														
EN-5045: Airport Protection Surfaces						E 2013												

EN-5004   Airport GSE Surface Management System

Description: Surveillance systems, either active or passive, will track Ground Support Equipment (GSE) on the airport surface. GSE location data will be available to the Ramp Operator, Air Navigation Service Provider (ANSP), and pilots as needed. Specifically, pilots will be aware of GSE movements which will be shown on flight deck situational displays. The system is needed to support low-visibility aircraft taxi operations, collision avoidance, and surface management. The system provides for interoperability between different types of GSE and aircraft. The system is modular depending on the size of the airport and the level of surveillance needed.

> *SOPR:* Industry   *Primary Supported OIs:* OI-5006, OI-5008
> *SOCR:*   *Primary Supported Enablers:* EN-0009, EN-5009

Enabler Group: Airside Operations Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5004: Airport GSE Surface Management System						E 2013												
EN-1025: Airport Surface Surveillance - Legacy ASDE-X	E 2008																	
EN-1002: Non-Cooperative Surveillance - GSE				E 2011														
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E 2011														
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-1005: Cooperative Surveillance - Ground Equipment					E 2012													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
D-2133: Air and Ground-based Runway Incursion Detection Technology			D 2011															
PI-0021: Protection of Data Shared Over-The-Air	P 2009																	

EN-5007   Zero or Low-Emissions Ground Support Equipment

Description: As a system, Ground Support Equipment (GSE) powered by zero or low-emissions fuels is available for implementation. Implementation of the system is a local airport decision based upon local air quality requirements.

> *SOPR:* Industry   *Primary Supported OIs:* OI-5002
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Airside Operations Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5007: Zero or Low-Emissions Ground Support Equipment			E 2010															

Enabler Listing

EN-5008   Ground Congestion Data Feed to Airport Acceptance Rate

Description: Information on the existing status of ground congestion on the airport surface, including the ramp, taxiways, overnight parking positions, gates, etc. is supplied to the Air Navigation Service Provider (ANSP) for input into Airport Acceptance Rate (AAR) guidance as part of the Collaborative Air Traffic Management (C-ATM) function (feeds into EN0056). Ground congestion data will provide differentiation on the impact to different aircraft operators (e.g., passenger airlines, cargo, general aviation, etc.).

     SOPR: FAA   *Primary Supported OIs:*

     SOCR: *Primary Supported Enablers:* EN-0036

Enabler Group: Airside Operations Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5008: Ground Congestion Data Feed to Airport Acceptance Rate								E 2015										
EN-1271: Flight and Surveillance Information Services - FAA Group 1				E 2011														
EN-5009: Airside Resource Management System - Level 1						E 2013												

EN-5009   Airside Resource Management System - Level 1

Description: Intelligent decision support systems will enable airport operators to proactively manage infrastructure and resources that have airside functions. This includes airfield inspections, safety procedures, emergency response services, security inspections, winter operational activities, and related airside operational components (e.g., stormwater management, airfield maintenance, etc.). At airports with scheduled air carrier service, this will include the regulatory requirements of 14 Code of Federal Regulations (CFR) Part 139 for airport certification. The decision support tool will assist in the proactive allocation of resources so that the airport can support growth in air traffic and passenger volume while maintaining acceptable levels of service, typically in an hourly or daily timeframe. The decision support tool is envisioned as software-based tool and/or application to enable resource allocation and management, using real-time geospatially referenced data (e.g., aircraft movements, demand forecast, ground support equipment location, etc.)

     SOPR: Industry   *Primary Supported OIs:* OI-4204, OI-5002, OI-5008

     SOCR: *Primary Supported Enablers:* EN-5008, EN-5011, EN-5209

Enabler Group: Resource Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5009: Airside Resource Management System - Level 1						E 2013												
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-5036: NetCentric Airport Information Standards				E 2011														
EN-5012: Airport Rescue Fire Fighting					E 2012													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-5004: Airport GSE Surface Management System						E 2013												
EN-5017: Airport Winter Operations Resource Management System - Level 1						E 2013												

EN-5010   Landside Resource Management System - Level 1

Description: Intelligent decision support systems will enable airport operators to proactively manage infrastructure and resources that have landside functions. This includes terminal passenger flows, security screening status, parking and airport curb status, etc. At airports with scheduled air carrier service, this will include the regulatory requirements of 14 Code of Federal Regulations (CFR) Part 139 for airport certification. The decision support tool will assist in the proactive allocation of resources so that the airport can support growth in air traffic and passenger volume while maintaining acceptable levels of service, typically in hourly or daily timeframe. The decision support tool is envisioned as software-based tool and/or application to enable resource allocation and management, using real-time geospatially referenced data (e.g., aircraft status, demand forecast, level of service status by component, etc.)

     SOPR: Industry   *Primary Supported OIs:* OI-5003

     SOCR: *Primary Supported Enablers:* EN-5011

Enabler Group: Resource Management Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5010: Landside Resource Management System - Level 1						E	2013											
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E	2011													
EN-5036: NetCentric Airport Information Standards				E	2011													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E	2013											

EN-5011 Airport Resource Management System - Level 1

Description: Integrated information management of on airport conditions regarding airside and landside functions during routine and emergency operations. This decision support tool assists with resource management across platforms that have both airside and landside functionality to assist in the overall management of the airport.

SOPR: Industry *Primary Supported OIs:* OI-5002, OI-5003, OI-5009

SOCR: *Primary Supported Enablers:*

Enabler Group: Resource Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5011: Airport Resource Management System - Level 1							E	2014										
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E	2011													
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E	2013											
EN-5009: Airside Resource Management System - Level 1						E	2013											
EN-5010: Landside Resource Management System - Level 1						E	2013											

EN-5012 Airport Rescue Fire Fighting

Description: Next generation Airport Rescue Fire Fighting (ARFF) equipment, procedures, and training provide effective response to aircraft incidents on the airfield. New ARFF equipment is under development for the purpose of supporting new composite and very large aircraft. In addition, ARFF equipment may benefit from use of technologies to improve vision during low visibility conditions and real-time situational awareness.

SOPR: FAA *Primary Supported OIs:* OI-4204, OI-5009

SOCR: *Primary Supported Enablers:* EN-5009

Enabler Group: Airside Operations Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5012: Airport Rescue Fire Fighting					E	2012												

EN-5013 Runway Friction - Integrated Condition Reporting

Description: The current runway friction measurement at an airport is disseminated on a continuous basis to users, based upon reports from ground and/or aircraft sensors (per EN-5014 and EN-5015, respectively) depending on which system(s) is/are in use at an airport at a given time. Potentially, one or both systems could be used at an airport. The real-time runway friction measurement data is used by aircraft operators to estimate safe runway landing distance. The data is also used by airport operators to evaluate the need to treat the runways for rubber removal or snow/ice accumulation.

SOPR: FAA *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-3127, EN-5217

Enabler Group: Airside Operations Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5013: Runway Friction - Integrated Condition Reporting								E	2015									
EN-5014: Runway Friction - Ground-Based Sensors and Technology						E	2013											
EN-5015: Aircraft Systems - Runway Friction Sensors and Technology							E	2014										

Enabler Listing

EN-5014 Runway Friction - Ground-Based Sensors and Technology

Description: Advanced, ground vehicle based sensors and/or technology are used to measure runway friction at airports. Program requirements and regulations are modeled after the International Civil Aviation Organization (ICAO) SnowTam program and are included in 14 CFR Part 139 for applicable airports. The runway friction data is used by airport operators to define the need to treat the runways for rubber removal or snow/ice accumulation. The data may also be used by aircraft operators to estimate runway landing distance.

SOPR: FAA	***Primary Supported OIs:***
SOCR:	***Primary Supported Enablers:*** EN-5013

Enabler Group: Airside Operations Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5014: Runway Friction - Ground-Based Sensors and Technology						**E** **2013**												

EN-5015 Aircraft Systems - Runway Friction Sensors and Technology

Description: New sensors/technology on aircraft is used to measure runway friction. The sensors transmit the friction data via net-centric and aircraft based datalinks. This information is used by aircraft operators to estimate runway landing distance to ensure safe operations. The information is also used by airport operators to define the need to treat the runways for snow and/or ice accumulation.

SOPR: Industry	***Primary Supported OIs:***
SOCR:	***Primary Supported Enablers:*** EN-5013, EN-5022

Enabler Group: Aircraft Weather-Related System Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5015: Aircraft Systems - Runway Friction Sensors and Technology							**E** **2014**											

EN-5016 Ice-Resistant Pavement Surfaces

Description: New technology pavement surfaces that are resistant to ice and snow accumulation (e.g., heated or friction) are available for implementation. The new pavement would require less frequent clearing during winter weather. Airport operators would decide to use the new pavement technology based upon cost-benefit analysis, aircraft operator input, and the pavement re-surfacing cycle.

SOPR: FAA	***Primary Supported OIs:*** OI-5008, OI-5110, OI-5111
SOCR:	***Primary Supported Enablers:*** EN-3133, EN-5032

Enabler Group: Airside Operations Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5016: Ice-Resistant Pavement Surfaces											**E** **2018**							

EN-5017 Airport Winter Operations Resource Management System - Level 1

Description: At airports with significant winter operations, a decision support system provides guidance for scheduling, prioritization, and active management of de-icing/anti-icing operations for both aircraft and airport movement surfaces during winter weather operations. The system will seek to align resources with weather information and aircraft demand in order to reduce delays. Airport operators would decide to implement the system based upon cost-benefit analysis and aircraft operator input.

SOPR: Industry	***Primary Supported OIs:*** OI-5002, OI-5008, OI-5010
SOCR:	***Primary Supported Enablers:*** EN-3123, EN-3127, EN-3132, EN-5009, EN-5032, EN-5217

Enabler Group: Resource Management Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5017: Airport Winter Operations Resource Management System - Level 1						E 2013												
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-5036: NetCentric Airport Information Standards				E 2011														
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												

EN-5018   Aircraft Systems - De-Ice/Anti-Ice Technology

Description: New air carrier jet aircraft have surfaces that are resistant to ground icing, with both de-ice and anti-ice capabilities. The materials provide for effective icing protection and are lightweight and energy-efficient. This would significantly reduce airport de-icing/anti-icing requirements.

SOPR: Industry   *Primary Supported OIs:* OI-5111

SOCR: *Primary Supported Enablers:* EN-3128

Enabler Group: Aircraft Weather-Related System Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5018: Aircraft Systems - De-Ice/Anti-Ice Technology																2024	E	
EN-5019: Aircraft Systems - Ground Icing Detection													E 2020					

EN-5019   Aircraft Systems - Ground Icing Detection

Description: Aircraft detect and evaluate icing conditions when on the ground. Provides information to pilots on actual status of icing conditions on aircraft. Safety is enhanced by providing direct measurement of icing, rather than the visual inspections and estimated anti-icing fluid holdover times that are used today.

SOPR: Industry   *Primary Supported OIs:* OI-5111

SOCR: *Primary Supported Enablers:* EN-3128, EN-5018

Enabler Group: Aircraft Weather-Related System Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5019: Aircraft Systems - Ground Icing Detection													E 2020					

EN-5020   Advanced De-Icing/Anti-Ice Fluids

Description: New deice/anti-ice fluids will be more effective, with longer holdover times and less fluid used per aircraft. The fluids will also meet environmental regulatory requirements.

SOPR: Industry   *Primary Supported OIs:* OI-5008, OI-5110

SOCR: *Primary Supported Enablers:* EN-3128

Enabler Group: Airside Operations Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5020: Advanced De-Icing/Anti-Ice Fluids											E 2018							
EN-6006: Baseline of Required Water Pollution Mitigation Needs				E 2011														
EN-6054: Enhanced Water Pollution Mitigation								E 2016										

EN-5021   Ground Based Non-Fluid De-Icing Technology

Description: Non-fluid based technologies (and supporting procedures) for de-icing aircraft are available for implementation. This would include, for example, infrared technologies to remove ice accumulations from aircraft. The technologies could be built into dedicated infrastructure (i.e., de-icing pads) or on ground vehicles. Airport operators would decide to implement the system based upon the particular needs of their facility; for example, dedicated de-icing infrastructure may not be beneficial at facilities that also need to do significant anti-icing operations during winter storms. While there are existing capabilities for non-fluid de-icing technology, improvements are needed in terms of operational efficiency and reduced physical footprint in order to foster improved use and adoption of the technology.

SOPR: Industry   *Primary Supported OIs:* OI-5110

SOCR: *Primary Supported Enablers:* EN-3127, EN-3132

Enabler Group: Airside Operations Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5021: Ground Based Non-Fluid De-Icing Technology								E 2015										

EN-5022   Deicing/Anti-Icing Holdover Time Input to Flight Object

Description: After the application of icing treatments, icing holdover times are incorporated into the flight object. This provides data to the Air Navigation Service Provider (ANSP) to aid in management of the departure queue so that aircraft do not exceed their holdover times (which would require the aircraft to be de-iced and anti-iced). Data is also provided to the Aircraft Winter Operations Resource System to aid the airport operator in the active management of de-icing/anti-icing operations. The aircraft operator will determine their specific icing holdover time for incorporation into the flight object, based upon operating specifications, procedures, and weather conditions.

SOPR: FAA   *Primary Supported OIs:* OI-0327, OI-5010
SOCR: *Primary Supported Enablers:* EN-3123, EN-3132

Enabler Group: Airside Operations Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5022: Deicing/Anti-Icing Holdover Time Input to Flight Object								E 2015										
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-5036: NetCentric Airport Information Standards				E 2011														
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												
EN-0002: Network-Enabled Flight Object Information							E 2014											
EN-5015: Aircraft Systems - Runway Friction Sensors and Technology							E 2014											

EN-5023   Advanced De-Icing/Anti-Icing Fluid Recovery

Description: Best Management Practices (BMP) are available to guide airport operators in evaluating infrastructure requirements to meet airport goals for recovery of spent de-icing/anti-icing fluids. The BMP includes guidance on available technology, infrastructure, and cost criteria. As guidance, the BMP would help airport operators to make infrastructure development decisions based upon the volume of de-icing/anti-icing fluids that are used at the airport. Upcoming Environment Protection Agency (EPA) rulemaking on recovery of spent de-icing/anti-icing fluids could affect the implementation of this guidance. Periodically, Federal Aviation Administration (FAA) and airport stakeholders would revise the BMP to incorporate new trends, regulations, and technology.

SOPR: FAA   *Primary Supported OIs:* OI-5110
SOCR: *Primary Supported Enablers:* EN-5024

Enabler Group: Airside Operations Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5023: Advanced De-Icing/Anti-Icing Fluid Recovery									E 2016									
EN-6006: Baseline of Required Water Pollution Mitigation Needs				E 2011														
EN-6054: Enhanced Water Pollution Mitigation									E 2016									

EN-5024   Water Quality Management

Description: Best management practices (BMP) are available to guide airport operators in evaluating infrastructure requirements to meet storm water management goals. The BMP includes guidance on technology, infrastructure, and cost criteria. Periodically, the Federal Aviation Administration (FAA) and airport stakeholders would revise the BMP to incorporate new trends, regulations, and technology.

SOPR: FAA   *Primary Supported OIs:*
SOCR: *Primary Supported Enablers:* EN-5032

Enabler Group: Airside Operations Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5024: Water Quality Management									E 2016									
EN-6006: Baseline of Required Water Pollution Mitigation Needs				E 2011														
EN-5023: Advanced De-Icing/Anti-Icing Fluid Recovery									E 2016									
EN-6054: Enhanced Water Pollution Mitigation									E 2016									

EN-5026   Design Guidelines for NextGen Airport Passenger Terminal Buildings

Description: Design guidelines for NextGen Airport Passenger Terminal Buildings is available to (1) facilitate the flexible integration of new new NextGen technology and procedures (e.g., advanced passenger and baggage processing, remote check-in, security, etc.), and (2) assist in the development of new terminal layouts and signage that promote smooth passenger flows during busy periods. Periodically, airport stakeholders will revise the design guidance to incorporate new trends, regulations, and technologies.

　　　　SOPR: FAA　　　　　　　　　*Primary Supported OIs:* OI-5003, OI-5005, OI-5014

　　　　SOCR:　　　　　　　　　　*Primary Supported Enablers:* EN-5032

Enabler Group: Landside Function Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5026: Design Guidelines for NextGen Airport Passenger Terminal Buildings								E 2015										
EN-5030: Remote Check-In Processing Systems						E 2013												
EN-4110: Checkpoint Screening Technology - Optimize Screening Infrastructure Requirements								E 2015										
R-0070: Applied Research on Optimizing Landside Design to Promote Passenger Movement						R 2013												
R-2116: Applied Research on Real-time Airport Gate Assignment						R 2013												

EN-5028   Integrated International Customs Border Protection/Security Service Provider Services

Description: Through integrated procedures, technology, and information sharing, the functions of Customs Border Protection (CBP, Customs/INS) are integrated with NextGen Shared Situational Awareness (SSA) goals to enable more efficient processing (in terms of both time and space/passenger). To the extent possible, CBP functions are coordinated with the Security Service Provider (SSP) to reduce duplication of screening processes.

　　　　SOPR: DHS　　　　　　　　　*Primary Supported OIs:* OI-5011, OI-5014

　　　　SOCR:　　　　　　　　　　*Primary Supported Enablers:* EN-5032

Enabler Group: Screening Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5028: Integrated International Customs Border Protection/Security Service Provider Services								E 2015										
PI-0079: Global Security			P 2010															

EN-5029   Intermodal Ground Transportation Information System

Description: Currently in development, industry-driven systems will consolidate information on available ground transportation modes at airports, including price, schedule, travel time, route, and real-time status. Using this consolidated data, third-party applications make the ground transportation mode options available for integration into traveler itineraries. With readily available, current, high-quality information, air travelers will be able to make informed decisions on transportation mode choice when traveling to/from the airport.

　　　　SOPR: Industry　　　　　　　*Primary Supported OIs:* OI-5012

　　　　SOCR:　　　　　　　　　　*Primary Supported Enablers:* EN-5032

Enabler Group: Landside Function Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5029: Intermodal Ground Transportation Information System						E 2013												
R-0090: Applied Research on Industry Standards for Intermodal Travel Planning				R 2011														
D-2119: Passenger Information System for Intermodal Travel Planning				D 2011														

Enabler Listing

EN-5030   Remote Check-In Processing Systems

Description: Industry-derived and cost-effective technology, information networks, protocols, and open-architecture standards are available support a remote (off-airport) passenger and baggage check-in processing system. Baggage and passengers are also tracked after check-in. The system is flexible and can support multiple scenarios for passenger, baggage, and security processing, in order to be configurable to the needs of airport(s) and airline(s). For example, baggage and passengers could be security screened at the remote location and then securely transported to the secure portion of the airport terminal, or the security screening could remain at the airport. The system would enable airlines and/or third-party companies that manage remote baggage check-in to seamlessly integrate baggage information into the airline systems, similar to existing systems that are in use today by resort hotels, convention centers, and cruise ships.

SOPR: Industry   *Primary Supported OIs:* OI-5015

SOCR: *Primary Supported Enablers:* EN-5026, EN-5032

Enabler Group: Landside Function Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5030: Remote Check-In Processing Systems						E 2013												
EN-1274: NextGen Security Information Services - DHS Group 1					E 2012													
R-1000: Applied Research on Efficient Baggage Screening Design Models				R 2011														
R-1390: Applied Research on Off-Airport Passenger and Baggage Processing				R 2011														

EN-5032   Streamlined Airport Development Processes

Description: Integrate airport, financial, and regional planning within a comprehensive process that monitors expected vs. actual performance and updates as needed. Airport planning and development is faster, more efficient, and aligned with NextGen goals. Programs, policies, and processes are in place to enable airports to more efficiently develop needed infrastructure in response to changing demand and technology. This includes improvements to design standards, planning and environmental tools and processes, finance, and integration with regional planning.

SOPR: FAA   *Primary Supported OIs:* OI-5004, OI-5005

SOCR: *Primary Supported Enablers:*

Enabler Group: Airport Advocacy and System Planning Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5032: Streamlined Airport Development Processes													E 2020					
EN-5033: Identification of Constrained Airports and Regions			E 2010															
EN-5036: NetCentric Airport Information Standards				E 2011														
EN-5041: Regional Planning Processes					E 2012													
EN-5001: Airport-Compatible Land Use						E 2013												
EN-5017: Airport Winter Operations Resource Management System - Level 1						E 2013												
EN-5029: Intermodal Ground Transportation Information System						E 2013												
EN-5030: Remote Check-In Processing Systems						E 2013												
EN-5045: Airport Protection Surfaces						E 2013												
EN-5003: Obstruction Measurement and Evaluation Process							E 2014											
EN-5026: Design Guidelines for NextGen Airport Passenger Terminal Buildings								E 2015										
EN-5028: Integrated International Customs Border Protection/Security Service Provider Services								E 2015										
EN-5024: Water Quality Management									E 2016									
EN-5043: Parallel Runway Separation Distance Standards									E 2016									
EN-5047: Airfield Design Standards										E 2017								
EN-5016: Ice-Resistant Pavement Surfaces											E 2018							
EN-5035: Post-Implementation Evaluations of Airport Development Actions													E 2020					
R-0310: Basic Research on Airport System Evolution in Large Metropolitan Areas											R 2018							
D-0560: Airport Information Architecture											D 2018							

Enabler Listing

EN-5033   Identification of Constrained Airports and Regions

Description: Through periodic modeling and evaluation efforts, airports and metropolitan regions that have airport capacity constraints will be identified for the purposes of Federal coordinating action. This effort will include use of metrics to evaluate airport capacity, including both airside (e.g., runways, taxiways, gates) and landside elements (e.g., terminal building level of service). Overall, this constraints analysis will be used to better inform national, regional, and airport planning efforts. This evaluation effort will build, for example, from the Federal Aviation Administration (FAA) work on the Future Airport Capacity Task (FACT-2) that identifies airports and regions that are projected to have capacity constraints through 2025.

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-5032

Enabler Group: Airport Advocacy and System Planning Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5033: Identification of Constrained Airports and Regions			E	2010														

EN-5035   Post-Implementation Evaluations of Airport Development Actions

Description: Airport development processes will include post-implementation evaluations of airport development actions. This includes revision and expansion of existing planning processes, guidelines, and requirements. Post-implementation evaluation of actions will be an essential component of the planning process, so the actual benefits of new infrastructure can be quantified and compared to the planned estimates. As part of the Environmental Management System (EMS), this will help to identify successful project strategies and valuable lessons learned. In addition, post implementation evaluations of environmental impacts will be done, so that actual conditions that vary from those estimated in Finding of No Significant Impacts (FONSIs) and Record of Decisions (RODs) can be identified and mitigated.

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-5032

Enabler Group: Airport Advocacy and System Planning Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5035: Post-Implementation Evaluations of Airport Development Actions													E	2020				
EN-6027: EMS Framework - Level 3 Ongoing Improvements				E	2011													
EN-6018: Enhanced Environmental Information								E	2015									

EN-5036   NetCentric Airport Information Standards

Description: Information standards are available to facilitate the sharing of accurate, high-quality airport data to NextGen users. Data formats are standardized, interchangeable, and geospatially referenced. Available data includes airport layout plans, obstruction data, operations data, and other relevant information needed for decision making. Airport data supports the Aeronautical Information Exchange Model (AIXM).

> *SOPR:* Airport Operator   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-5003, EN-5009, EN-5010, EN-5017, EN-5022,
>   EN-5032

Enabler Group: Information Sharing Standards Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5036: NetCentric Airport Information Standards				E	2011													
EN-1230: Enterprise Networking Governance Structure			E	2010														

Enabler Listing

EN-5041   Regional Planning Processes

Description: Develop regional system plans for congested metropolitan areas that identify airport capacity solutions . The plans will consider facility infrastructure needs at specific airports, given the ongoing or potential new roles of an airport such as a commercial service hub or general aviation reliever. Ground access and intermodal needs will also be considered as appropriate. Since most airports already develop facility requirements through their master planning process, the goal of the regional plans will be to provide a comprehensive, strategic perspective on the enhancements needed for the airport system to meet regional demand. The plans will identify priority improvements that are needed to grow the capacity of the region's airport system. Regional plans will also evaluate governance options for implementation of recommended solutions, such as intergovernmental agreements to define roles and responsibilities as part of regional coordination efforts.

SOPR: FAA	***Primary Supported OIs:***
SOCR:	***Primary Supported Enablers:*** EN-5032

Enabler Group: Airport Advocacy and System Planning Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5041: Regional Planning Processes					E	2012												
R-0060: Applied Research on Intermodal Travel Behavior in High-Density Corridors			R	2010														
R-0080: Applied Research of Best Management Practices for Regional System Planning			R	2010														
R-0310: Basic Research on Airport System Evolution in Large Metropolitan Areas			R	2010														

EN-5043   Parallel Runway Separation Distance Standards

Description: Based upon the Air Navigation Service Provider (ANSP) procedures for dependent and independent operations on parallel runways, including wake turbulence considerations, new runway separation criteria are established based upon NextGen capabilities. These standards would guide development of new runways, in terms of the distance required between parallel runway centerlines. Potentially Required Navigation Performance (RNP), advanced avionics and ground-based technologies, and improved wake turbulence prediction and sensing in all weather conditions would permit parallel runways to be built closer together than is possible today. This enables construction of new runways with reduced needs for land acquisition (e.g., build within existing property) and with a smaller overall noise impact area.

SOPR: FAA	***Primary Supported OIs:*** OI-5002, OI-5004
SOCR:	***Primary Supported Enablers:*** EN-5032

Enabler Group: Airport Advocacy and System Planning Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5043: Parallel Runway Separation Distance Standards									E	2016								
EN-0152: Wake Vortex Configuration Advisory Decision Support - Level 3 Dynamic Drift/Decay									E	2016								
PI-0120: PNT Performance Requirements	P	2008																

EN-5045   Airport Protection Surfaces

Description: Airport protection surfaces define zones and the maximum height of objects within zones so as to not interfere with the safe flight of aircraft and established instrument procedures. Objects that exceed the maximum height require mitigation (e.g., removal, lighting, or change in flight procedures). Access to airports can be reduced during visual or inclement weather due to changes in the minimum visibility/ceiling requirements for approach procedures that are caused by an obstruction. Accordingly, airport protection surfaces will be revised to incorporate NextGen compatibilities (e.g., Required Navigation Performance (RNP)) and provide a comprehensive definition among regulatory guidance in 14 Code of Federal Regulations (CFR) Part 77, Terminal Instrument Procedures (TERPS), and single-engine out climb gradients (14 CFR Part 23, 25, 121). Data supports the AIEM.

SOPR: FAA	***Primary Supported OIs:*** OI-5000
SOCR:	***Primary Supported Enablers:*** EN-5003, EN-5032

Enabler Group: Airport Advocacy and System Planning Enablers

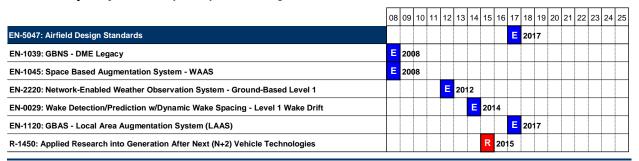		08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5045: Airport Protection Surfaces						E	2013											

Enabler Listing

EN-5047   Airfield Design Standards

Description: As NextGen requirements become better defined, airfield design standards will be revised accordingly. For example, new wake turbulence sensors on the airport may need specific clearance areas or have other design requirements.

> *SOPR:* FAA   *Primary Supported OIs:*
>
> *SOCR:*   *Primary Supported Enablers:* EN-5032

Enabler Group: Airport Advocacy and System Planning Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5047: Airfield Design Standards										E 2017								
EN-1039: GBNS - DME Legacy	E 2008																	
EN-1045: Space Based Augmentation System - WAAS	E 2008																	
EN-2220: Network-Enabled Weather Observation System - Ground-Based Level 1					E 2012													
EN-0029: Wake Detection/Prediction w/Dynamic Wake Spacing - Level 1 Wake Drift							E 2014											
EN-1120: GBAS - Local Area Augmentation System (LAAS)										E 2017								
R-1450: Applied Research into Generation After Next (N+2) Vehicle Technologies								R 2015										

EN-5052   Ramp Lightning Detection and Deflection

Description: Research is needed on the potential of new technologies to mitigate the impact of lightning during thunderstorms on ramp operations. Today, lightning events can require that ramp operations cease in order to protect working personnel.

> *SOPR:* Industry   *Primary Supported OIs:* OI-5008
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Airside Operations Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5052: Ramp Lightning Detection and Deflection								E 2015										
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				E 2011														
EN-2010: NextGen 4-D Weather Cube Information - Level 1 Initial Operating Capability						E 2013												

EN-5053   Airport Intermodal Ground Access Mobility Systems

Description: Establish program(s) that will facilitate the timely development of high-density intermodal infrastructure to meet airport ground access and inter-city transportation needs. Strategic initiatives will be needed to (1) implement regional transportation solutions across multiple governmental jurisdictions and (2) identify appropriate finance mechanisms. Airport ground access projects that serve airport users are generally eligible for Airport Improvement Program (AIP) and PFC funding. However, the use of airport revenue to fund non-aviation, off-airport projects is generally prohibited. Accordingly, new and innovative public finance mechanisms will be needed to fund large-scale intermodal initiatives and infrastructure.

> *SOPR:* DOT   *Primary Supported OIs:* OI-5012
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: Landside Function Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5053: Airport Intermodal Ground Access Mobility Systems							E 2014											
R-0060: Applied Research on Intermodal Travel Behavior in High-Density Corridors					R 2012													

Enabler Listing

EN-5209   Airside Resource Management System - Level 2

Description: Intelligent decision support systems will enable airport operators to proactively manage infrastructure and resources that have airside functions. Building from EN-5009, with incorporation of Airport Winter Operations Resource Management System (Level 2) and environmental information into the decision support systems for airside resource management.

SOPR: Industry	*Primary Supported OIs:* OI-5002, OI-5008
SOCR:	*Primary Supported Enablers:* EN-5211

Enabler Group: Resource Management Enablers

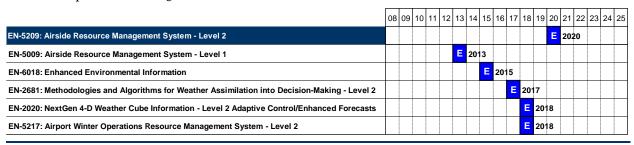|	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5209: Airside Resource Management System - Level 2													E	2020				
EN-5009: Airside Resource Management System - Level 1						E	2013											
EN-6018: Enhanced Environmental Information								E	2015									
EN-2681: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 2										E	2017							
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E	2018						
EN-5217: Airport Winter Operations Resource Management System - Level 2											E	2018						

EN-5210   Landside Resource Management System - Level 2

Description: Intelligent decision support systems will enable airport operators to proactively manage infrastructure and resources that have landside functions. Building from EN-5010, includes environmental information into the decision support system for landside resource management.

SOPR: Industry	*Primary Supported OIs:* OI-5003
SOCR:	*Primary Supported Enablers:* EN-5211

Enabler Group: Resource Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5210: Landside Resource Management System - Level 2													E	2020				
EN-6018: Enhanced Environmental Information								E	2015									
EN-2681: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 2										E	2017							
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E	2018						

EN-5211   Airport Resource Management System - Level 2

Description: Integrated information management of on airport conditions regarding airside/landside functions and emergency/routine operations. This decision support tool assists with resource management across platforms that have both airside and landside functionality to assist in the overall management of the airport. Building from EN-5011, this Level 2 enabler incorporates environmental information into the decision support systems for airport resource management.

SOPR: Industry	*Primary Supported OIs:* OI-5002, OI-5003
SOCR:	*Primary Supported Enablers:*

Enabler Group: Resource Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5211: Airport Resource Management System - Level 2													E	2020				
EN-2681: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 2										E	2017							
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E	2018						
EN-5209: Airside Resource Management System - Level 2													E	2020				
EN-5210: Landside Resource Management System - Level 2													E	2020				

Enabler Listing

EN-5217   Airport Winter Operations Resource Management System - Level 2

Description: At airports with significant winter operations, a decision support system provides guidance for scheduling, prioritization, and active management of de-icing/anti-icing operations during winter weather operations. The system will seek to align resources with aircraft demand in order to reduce delays. Airport operators would decide to implement the system based upon cost-benefit analysis and aircraft operator input. Building from EN5017, this Level 2 enabler incorporates advances in runway friction measurement, monitoring, and information dissemination.

SOPR: Industry	*Primary Supported OIs:* OI-5008, OI-5110
SOCR:	*Primary Supported Enablers:* EN-3125, EN-3128, EN-3133, EN-5209

Enabler Group: Resource Management Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-5217: Airport Winter Operations Resource Management System - Level 2											E 2018							
EN-5017: Airport Winter Operations Resource Management System - Level 1						E 2013												
EN-5013: Runway Friction - Integrated Condition Reporting								E 2015										
EN-2681: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 2										E 2017								
EN-2020: NextGen 4-D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts											E 2018							

EN-6000   Environmental Management Strategy

Description: Environmental Management Strategy - An environmental strategy to achieve NextGen goals is developed. The focus of the strategy is to enable the long-term viability/sustainability of the national airspace system.

SOPR: FAA	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-6004, EN-6005, EN-6006, EN-6007, EN-6011, EN-6012, EN-6013, EN-6022, EN-6023, EN-6024, EN-6038, EN-6045

Enabler Group: EMF Policy Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6000: Environmental Management Strategy	E 2008																	
PI-0101: Initial Aviation Environmental Policy	P 2008																	
PI-0104: Initial EMS Approach	P 2008																	

EN-6001   EMS Framework - Level 1 Development

Description: A national framework, for applying an Environmental Management System (EMS) approaches to achieve NextGen environmental protection goals is developed. The developed framework will facilitate effective adoption of NextGen EMS measures and coordination of those measures with EMS programs of applicable aviation organizations in the U.S.

SOPR: FAA	*Primary Supported OIs:*
SOCR:	*Primary Supported Enablers:* EN-6002, EN-6013, EN-6016

Enabler Group: EMF Policy Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6001: EMS Framework - Level 1 Development	E 2008																	
PI-0101: Initial Aviation Environmental Policy	P 2008																	
PI-0102: Initial NextGen Long-Term Environmental Goals and Targets	P 2008																	

EN-6002   EMS Framework - Level 2 Pilot

Description: An EMS approach to achieve NextGen environmental protection goals is adopted by an initial set of aviation organizations in the US.

SOPR: FAA	*Primary Supported OIs:* OI-5000, OI-6014
SOCR:	*Primary Supported Enablers:* EN-6027

Enabler Group: EMF Policy Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6002: EMS Framework - Level 2 Pilot		E 2009																
EN-6001: EMS Framework - Level 1 Development	E 2008																	
PI-0104: Initial EMS Approach	P 2008																	

EN-6004 Environmentally Improved Terminal Area Navigation - Level 1 Tools

Description: Tools to design optimum terminal area airspace trajectories and tools to schedule and procedures to deliver arriving and departing aircraft from an environment and energy perspective.

　　　　SOPR: FAA　　　　　*Primary Supported OIs:* OI-6008

　　　　SOCR:　　　　　　*Primary Supported Enablers:* EN-6005, EN-6042, EN-6044, EN-6045

Enabler Group: EMF Operation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6004: Environmentally Improved Terminal Area Navigation - Level 1 Tools								E 2015										
EN-6000: Environmental Management Strategy	E 2008																	
EN-6020: Environmentally Improved Surface Operations - Level 1 - Initial			E 2010															
D-1730: Aircraft Procedures and Control Technologies to Reduce Environmental Impacts						D 2013												
D-1740: Environmental Impact Management Capability						D 2013												
PI-0114: Environmental Standards - Global Harmonization			P 2010															

EN-6005 Environmentally Improved En Route Air Navigation -Level 1 Route Planning/Selection

Description: Assessments of the trade space of environmental operational en route procedures for implementation throughout the National Airspace System (NAS) by using appropriate advanced environmental procedures, with a focus on reduced noise, emissions, fuel burn methods, and operational procedures (i.e., optimal runway selection and regional routes). (Note: This also includes the ability to plan routes that minimize noise over national parks and other noise sensitive locations.)

　　　　SOPR: FAA　　　　　*Primary Supported OIs:* OI-6005

　　　　SOCR:　　　　　　*Primary Supported Enablers:* EN-6030

Enabler Group: EMF Operation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6005: Environmentally Improved En Route Air Navigation -Level 1 Route Planning/Selection								E 2015										
EN-6000: Environmental Management Strategy	E 2008																	
EN-6004: Environmentally Improved Terminal Area Navigation - Level 1 Tools								E 2015										
D-1730: Aircraft Procedures and Control Technologies to Reduce Environmental Impacts						D 2013												
D-1740: Environmental Impact Management Capability						D 2013												
PI-0114: Environmental Standards - Global Harmonization			P 2010															

EN-6006 Baseline of Required Water Pollution Mitigation Needs

Description: Baseline of required water pollution mitigation needs.

　　　　SOPR: FAA　　　　　*Primary Supported OIs:* OI-5110, OI-6014

　　　　SOCR:　　　　　　*Primary Supported Enablers:* EN-3127, EN-5020, EN-5023, EN-5024, EN-6054

Enabler Group: EMF Science and Metrics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6006: Baseline of Required Water Pollution Mitigation Needs				E 2011														
EN-6000: Environmental Management Strategy	E 2008																	
PI-0102: Initial NextGen Long-Term Environmental Goals and Targets	P 2008																	

Enabler Listing

EN-6007   Environmentally Improved Airframe and Engine Technology - Level 1 (N+1)

Description: Subsonic engine and airframe technologies that reduce noise, local emissions, greenhouse gas emissions, and have interoperability with alternative fuel sources. Economically viable supersonic aircraft with enhanced environmental performance.

> *SOPR:* FAA   *Primary Supported OIs:*
> *SOCR:*   *Primary Supported Enablers:* EN-6035, EN-6036

Enabler Group: EMF Technology Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6007: Environmentally Improved Airframe and Engine Technology - Level 1 (N+1)						E 2013												
EN-6000: Environmental Management Strategy	E 2008																	
EN-6032: Science and Metrics of Noise - Level 2 Advanced						E 2011												
EN-6033: Science and Metrics of Local Emissions - Level 2 Advanced						E 2011												
EN-6034: Environmental Tradeoffs and Metrics of Fuel Burn - Level 2 Enhanced						E 2011												
R-0810: Applied Research on Noise, Emissions, and Performance Trade-offs for N+1 Aircraft						R 2011												
D-1010: NextGen Vehicle Technologies						D 2011												
PI-0114: Environmental Standards - Global Harmonization			P 2010															
PI-0109: Environmental Technologies Development					P 2012													

EN-6008   Avionics to Reduce Environmental Impacts - Level 1

Description: Advanced aircraft technologies to support operational capabilities that reduce environmental impacts. This included capabilities for the Flight Management System (FMS), Required Navigation Performance (RNP), Area Navigation (RNAV), and energy management guidance that support en route, terminal and surface operations that reduce environmental impact.

> *SOPR:* FAA   *Primary Supported OIs:* OI-0329, OI-6005, OI-6008, OI-6012
> *SOCR:*   *Primary Supported Enablers:* EN-6044

Enabler Group: EMF Operation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6008: Avionics to Reduce Environmental Impacts - Level 1								E 2015										
PI-0014: Aircraft Equipage Implementation Policy		P 2009																
PI-0114: Environmental Standards - Global Harmonization			P 2010															

EN-6010   Available Alternative Fuels - Level 1

Description: Obtain American Society for Testing and Materials (ASTM) and the Federal Aviation Administration (FAA) approval for a drop in 50-50 blend of conventional jet fuel with a Synthetic Paraffinic Kerosene (SPK) fuel created through Fischer-Tropsch (F-T) synthesis. Synthetic fuel use offers the potential for reducing the impacts of aviation on air quality.

> *SOPR:* FAA   *Primary Supported OIs:*
> *SOCR:*   *Primary Supported Enablers:* EN-6049

Enabler Group: EMF Technology Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6010: Available Alternative Fuels - Level 1	E 2008																	
EN-6024: Environmental Tradeoffs and Metrics of Fuel Burn – Level 1 Baseline	E 2008																	
EN-6038: Science of Global Climate - Level 1 Baseline	E 2008																	

Enabler Listing

EN-6011   Environmental Impact Modeling and Assessment - Level 1

Description: First Generation integrated environmental models allow selection of the optimum environmental performance characteristics, including informed decisions on any necessary trade-offs.

SOPR: FAA   *Primary Supported OIs:* OI-6005, OI-6008, OI-6012, OI-6014, OI-6017

SOCR: *Primary Supported Enablers:* EN-6048

Enabler Group: EMF Tools Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6011: Environmental Impact Modeling and Assessment - Level 1				E 2011														
EN-6000: Environmental Management Strategy	E 2008																	
EN-6012: Baseline Environmental Condition - Level 1	E 2008																	
EN-6022: Science and Metrics of Noise - Level 1 Baseline	E 2008																	
EN-6023: Science and Metrics of Local Emissions - Level 1 Baseline	E 2008																	
EN-6024: Environmental Tradeoffs and Metrics of Fuel Burn – Level 1 Baseline	E 2008																	
EN-6038: Science of Global Climate - Level 1 Baseline	E 2008																	
PI-0114: Environmental Standards - Global Harmonization			P 2010															
PI-0105: Refined NextGen Long-Term Environmental Targets				P 2011														
PI-0113: Environmental Impact Modeling and Assessment				P 2011														

EN-6012   Baseline Environmental Condition - Level 1

Description: Baseline of current levels of aviation noise and emissions are available to serve as a benchmark for analysis demonstrating benefits or impacts of NextGen environmental performance.

SOPR: FAA   *Primary Supported OIs:*

SOCR: *Primary Supported Enablers:* EN-6011, EN-6047

Enabler Group: EMF Tools Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6012: Baseline Environmental Condition - Level 1	E 2008																	
EN-6000: Environmental Management Strategy	E 2008																	
EN-6022: Science and Metrics of Noise - Level 1 Baseline	E 2008																	
EN-6023: Science and Metrics of Local Emissions - Level 1 Baseline	E 2008																	
EN-6024: Environmental Tradeoffs and Metrics of Fuel Burn – Level 1 Baseline	E 2008																	
EN-6038: Science of Global Climate - Level 1 Baseline	E 2008																	
PI-0102: Initial NextGen Long-Term Environmental Goals and Targets	P 2008																	

EN-6013   NextGen Environmental Protection Goals - Level 1 Initial

Description: Initial NextGen environmental protection goals are established for community noise, air quality, airport water quality, and climate change impacts. First generation appropriate metrics to characterize impacts and assess mitigation options, and analytical and decision support tools to manage environmental impacts are adopted.

SOPR: FAA   *Primary Supported OIs:* OI-6014

SOCR: *Primary Supported Enablers:* EN-6041

Enabler Group: EMF Policy Enablers

Enabler Listing																			

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6013: NextGen Environmental Protection Goals - Level 1 Initial	E 2008																	
EN-6000: Environmental Management Strategy	E 2008																	
EN-6001: EMS Framework - Level 1 Development	E 2008																	
PI-0101: Initial Aviation Environmental Policy	P 2008																	
PI-0102: Initial NextGen Long-Term Environmental Goals and Targets	P 2008																	
PI-0104: Initial EMS Approach	P 2008																	

EN-6016   EMS Outreach Program

Description: An long-term outreach program is initiated that encourages the adoption and implementation of an Environmental Management System (EMS) approach to achieve NextGen environmental goals by all aviation organizations in the U.S. There maybe environmental goals related incentive programs.

> *SOPR:* FAA   *Primary Supported OIs:* OI-6014
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: EMF Policy Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6016: EMS Outreach Program		E 2009																
EN-6001: EMS Framework - Level 1 Development	E 2008																	
PI-0104: Initial EMS Approach	P 2008																	

EN-6018   Enhanced Environmental Information

Description: Enhanced information on progress toward achieving NextGen environmental protection goals is available through the Environmental Management System (EMS) reporting.

> *SOPR:* FAA   *Primary Supported OIs:* OI-6020
>
> *SOCR:*   *Primary Supported Enablers:* EN-5035, EN-5209, EN-5210

Enabler Group: EMF Policy Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6018: Enhanced Environmental Information								E 2015										
EN-1231: NextGen Enterprise Network - FAA				E 2011														
PI-0112: Dynamic Environmental Management Systems Approach								P 2015										

EN-6020   Environmentally Improved Surface Operations - Level 1 - Initial

Description: Demonstrate initial surface operation mechanisms to enhance airline and Air Traffic Control (ATC) surveillance and movement efficiency that reduces aircraft fuel burn and emissions (e.g. Atlantic Interoperability Initiative to Reduce Emissions (AIRE)). Mechanisms of radar surveillance and associated automation, such as ASDE-X, multi-lateration, and surface movement surveillance assist optimizing taxi and runway sequencing for arriving and departing aircraft to reduce environmental impacts. Automation in conjunction with surface procedures allow for initial Trajectory Based Operations (TBO) on the ground in demonstrating the value of collaborative surface operations to reduce aircraft fuel burn and emissions.

> *SOPR:* FAA   *Primary Supported OIs:* OI-0320, OI-6008
>
> *SOCR:*   *Primary Supported Enablers:* EN-0026, EN-6004, EN-6046

Enabler Group: EMF Operation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6020: Environmentally Improved Surface Operations - Level 1 - Initial			E 2010															

Enabler Listing

EN-6022   Science and Metrics of Noise - Level 1 Baseline

Description: Current scientific understanding of aircraft noise characterization and health and welfare impacts is applied to support metrics and targets definitions.

  SOPR: FAA   *Primary Supported OIs:* OI-6014

  SOCR: *Primary Supported Enablers:* EN-6011, EN-6012, EN-6032

Enabler Group: EMF Science and Metrics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6022: Science and Metrics of Noise - Level 1 Baseline	E 2008																	
EN-6000: Environmental Management Strategy	E 2008																	
PI-0102: Initial NextGen Long-Term Environmental Goals and Targets	P 2008																	

EN-6023   Science and Metrics of Local Emissions - Level 1 Baseline

Description: Current scientific understanding of local aviation emissions characterization and health and welfare impacts is applied to support metrics and targets definitions for Oxides of Nitrogen (NOx), Carbon Monoxide (CO), Unburned Hydrocarbon (UHC) and Oxides of Sulfur (SOX).

  SOPR: FAA   *Primary Supported OIs:* OI-6014

  SOCR: *Primary Supported Enablers:* EN-6011, EN-6012, EN-6033

Enabler Group: EMF Science and Metrics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6023: Science and Metrics of Local Emissions - Level 1 Baseline	E 2008																	
EN-6000: Environmental Management Strategy	E 2008																	
PI-0102: Initial NextGen Long-Term Environmental Goals and Targets	P 2008																	

EN-6024   Environmental Tradeoffs and Metrics of Fuel Burn – Level 1 Baseline

Description: Initial scientific understanding of the environmental benefits, constraints, and trade-offs of aircraft fuel burn.

  SOPR: FAA   *Primary Supported OIs:* OI-6014

  SOCR: *Primary Supported Enablers:* EN-6010, EN-6011, EN-6012, EN-6034

Enabler Group: EMF Science and Metrics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6024: Environmental Tradeoffs and Metrics of Fuel Burn – Level 1 Baseline	E 2008																	
EN-6000: Environmental Management Strategy	E 2008																	
PI-0102: Initial NextGen Long-Term Environmental Goals and Targets	P 2008																	

EN-6027   EMS Framework - Level 3 Ongoing Improvements

Description: An Environmental Management System (EMS) approach to achieve NextGen environmental protection goals is available to all aviation organizations in the US. Further improvements to the EMS framework continue for subsequent applications.

  SOPR: FAA   *Primary Supported OIs:* OI-6014

  SOCR: *Primary Supported Enablers:* EN-5035

Enabler Group: EMF Policy Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6027: EMS Framework - Level 3 Ongoing Improvements				E 2011														
EN-6002: EMS Framework - Level 2 Pilot		E 2009																
PI-0114: Environmental Standards - Global Harmonization			P 2010															
PI-0105: Refined NextGen Long-Term Environmental Targets				P 2011														
PI-0106: Evolved EMS Approach				P 2011														

Enabler Listing

EN-6030   Environmentally Improved En Route Air Navigation -Level 2 Dynamic Routing

Description: Pilot demonstrations for use of environmental operational en route procedures for national airspace system reduction of noise, emissions, and fuel burn. The Environmental Management System (EMS) is embedded into en route flight planning on an ongoing and real-time basis. Integrated noise/emission/fuel/burn/cost/efficiency information feeds into and is used to dynamically to generate route changes in Four Dimensional Trajectories (4DTs) for wind or weather that are optimized to reduce impact.

SOPR: FAA   *Primary Supported OIs:* OI-6022

SOCR: *Primary Supported Enablers:*

Enabler Group: EMF Operation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6030: Environmentally Improved En Route Air Navigation -Level 2 Dynamic Routing											E 2018							
EN-6005: Environmentally Improved En Route Air Navigation -Level 1 Route Planning/Selection								E 2015										
D-1730: Aircraft Procedures and Control Technologies to Reduce Environmental Impacts									D 2016									
PI-0112: Dynamic Environmental Management Systems Approach								P 2015										

EN-6032   Science and Metrics of Noise - Level 2 Advanced

Description: Environmental metrics that address noise are established for key components of the Air Transportation System (ATS) that support decision-making and policy development to sustain capacity while limiting the National Airspace System's (NAS's) environmental effects. Advance scientific understanding of characterization noise production from aircraft, and the propagation of noise and its impact on the population. Establish the trade-offs with other environmental impacts, and costs and benefits of mitigating aircraft noise. Enhanced scientific understanding will support refining environmental metrics and target definitions.

SOPR: FAA   *Primary Supported OIs:* OI-6020

SOCR: *Primary Supported Enablers:* EN-6007, EN-6047

Enabler Group: EMF Science and Metrics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6032: Science and Metrics of Noise - Level 2 Advanced				E 2011														
EN-6022: Science and Metrics of Noise - Level 1 Baseline	E 2008																	
PI-0114: Environmental Standards - Global Harmonization			P 2010															
PI-0105: Refined NextGen Long-Term Environmental Targets				P 2011														

EN-6033   Science and Metrics of Local Emissions - Level 2 Advanced

Description: Environmental metrics that address emissions are established for key components of the Air Transportation System (ATS) that support decision-making and policy development to sustain capacity while limiting the National Airspace System's (NAS's) environmental effects. Advance scientific understanding and characterization of aircraft local emissions, and the atmospheric transport of these emissions. Establish the trade-offs with other environmental impacts, and costs and benefits of mitigating aviation. Enhanced scientific understanding will support refining existing emissions environmental metrics and target definitions, as well as establishing metrics and targets for Particulate Matter (PM), and Hazardous Air Pollutants (HAPs).

SOPR: FAA   *Primary Supported OIs:* OI-6020

SOCR: *Primary Supported Enablers:* EN-6007, EN-6047

Enabler Group: EMF Science and Metrics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6033: Science and Metrics of Local Emissions - Level 2 Advanced				E 2011														
EN-6023: Science and Metrics of Local Emissions - Level 1 Baseline	E 2008																	
R-1760: Applied Research on the Methodologies and Metrics to Assess Climate Change Impacts		R 2009																
D-2141: Methodologies and Metrics to Assess Aviation's Impact on Climate Change		D 2009																
PI-0114: Environmental Standards - Global Harmonization			P 2010															
PI-0105: Refined NextGen Long-Term Environmental Targets				P 2011														

Enabler Listing

EN-6034   Environmental Tradeoffs and Metrics of Fuel Burn - Level 2 Enhanced

Description: Advanced scientific understanding of the environmental benefits, constraints and trade-offs of aircraft fuel burn. Includes further understanding of fuel burn from aircraft engine and/or flight performance, in addition to exhaust gas production. Scientific understanding would further support economic feasibility, environmental impacts, and drop in potential of latent alternative fuels. Environmental metrics that address fuel burn are established for key components of the Air Transportation System (ATS) that support decision-making and policy development to sustain capacity while limiting the National Airspace System's (NAS's) environmental effects.

> *SOPR:* FAA   *Primary Supported OIs:* OI-6017, OI-6020
> *SOCR:*   *Primary Supported Enablers:* EN-6007, EN-6047, EN-6048

Enabler Group: EMF Science and Metrics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6034: Environmental Tradeoffs and Metrics of Fuel Burn - Level 2 Enhanced				E **2011**														
EN-6024: Environmental Tradeoffs and Metrics of Fuel Burn – Level 1 Baseline	E **2008**																	
R-0810: Applied Research on Noise, Emissions, and Performance Trade-offs for N+1 Aircraft	R **2009**																	
PI-0114: Environmental Standards - Global Harmonization			P **2010**															
PI-0105: Refined NextGen Long-Term Environmental Targets				P **2011**														

EN-6035   Environmentally Improved Aircraft Airframe and Engines - Level 1

Description: Vehicle technologies incorporating advances in fuel efficiency, emissions, and noise reduction are available for the fleet.

> *SOPR:* FAA   *Primary Supported OIs:* OI-6012
> *SOCR:*   *Primary Supported Enablers:* EN-6037

Enabler Group: EMF Technology Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6035: Environmentally Improved Aircraft Airframe and Engines - Level 1								E **2015**										
EN-6007: Environmentally Improved Airframe and Engine Technology - Level 1 (N+1)						E **2013**												
R-1030: Applied Research on Environmental Metrics for New and Alternative Vehicle Classes						R **2013**												
D-2110: Environmental Metrics of New and Alternative Vehicle Classes						D **2013**												

EN-6036   Environmentally Improved Airframe and Engine Technology - Level 2 (N+2)

Description: Next-generation (N+2) subsonic aircraft vehicle and fuel technologies that reduce noise, local emissions, and greenhouse gas emissions at the source and enhance a stable secure fuel supply. Including economically viable supersonic aircraft with enhanced environmental performance and environmental impact and increased performance rotorcraft configurations.

> *SOPR:* NASA   *Primary Supported OIs:*
> *SOCR:*   *Primary Supported Enablers:* EN-6037

Enabler Group: EMF Technology Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6036: Environmentally Improved Airframe and Engine Technology - Level 2 (N+2)											E **2018**							
EN-6007: Environmentally Improved Airframe and Engine Technology - Level 1 (N+1)						E **2013**												
R-1380: Applied Research on Rotorcraft Configurations									R **2016**									
R-1410: Applied Research on Noise, Emissions, and Performance Trade-offs for N+2 Aircraft									R **2016**									
R-1450: Applied Research into Generation After Next (N+2) Vehicle Technologies									R **2016**									
R-1570: Applied Research on Overland Supersonic Cruise Aircraft									R **2016**									

Enabler Listing

EN-6037   Environmentally Improved Aircraft Airframe and Engines - Level 2

Description: Advanced vehicle technologies incorporating advances in fuel efficiency and emissions and noise reduction are available for the fleet.

    SOPR: NASA   *Primary Supported OIs:* OI-6023

    SOCR: *Primary Supported Enablers:*

Enabler Group: EMF Technology Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6037: Environmentally Improved Aircraft Airframe and Engines - Level 2														E 2021				
EN-6035: Environmentally Improved Aircraft Airframe and Engines - Level 1								E 2015										
EN-6036: Environmentally Improved Airframe and Engine Technology - Level 2 (N+2)											E 2018							
D-2110: Environmental Metrics of New and Alternative Vehicle Classes												D 2019						

EN-6038   Science of Global Climate - Level 1 Baseline

Description: Current scientific understanding of global emissions characterization and health and welfare impacts is applied and assessed to establish knowledge gaps.

    SOPR: FAA   *Primary Supported OIs:* OI-6014

    SOCR: *Primary Supported Enablers:* EN-6010, EN-6011, EN-6012, EN-6053

Enabler Group: EMF Science and Metrics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6038: Science of Global Climate - Level 1 Baseline	E 2008																	
EN-6000: Environmental Management Strategy	E 2008																	
PI-0102: Initial NextGen Long-Term Environmental Goals and Targets	P 2008																	

EN-6039   Enhanced Global Climate Metrics

Description: Enhanced environmental metrics that address global climate change are established for key components of the Air Transportation System (ATS) that support decision-making and policy development to sustain or grow capacity while limiting the National Airspace System's (NAS's) environmental effects.

    SOPR: FAA   *Primary Supported OIs:* OI-6022

    SOCR: *Primary Supported Enablers:* EN-6047

Enabler Group: EMF Science and Metrics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6039: Enhanced Global Climate Metrics				E 2011														
EN-6053: Science of Global Climate - Level 2 Advanced				E 2011														
R-1760: Applied Research on the Methodologies and Metrics to Assess Climate Change Impacts		R 2009																
D-2141: Methodologies and Metrics to Assess Aviation's Impact on Climate Change		D 2009																
PI-0105: Refined NextGen Long-Term Environmental Targets				P 2011														

EN-6041   NextGen Environmental Protection Goals - Level 2 Refined

Description: NextGen environmental protection goals are informed and refined with improved scientific understanding and enhanced metrics.

    SOPR: FAA   *Primary Supported OIs:* OI-5000, OI-6020

    SOCR: *Primary Supported Enablers:*

Enabler Group: EMF Policy Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6041: NextGen Environmental Protection Goals - Level 2 Refined				E 2011														
EN-6013: NextGen Environmental Protection Goals - Level 1 Initial	E 2008																	
EN-6053: Science of Global Climate - Level 2 Advanced				E 2011														
PI-0114: Environmental Standards - Global Harmonization			P 2010															
PI-0105: Refined NextGen Long-Term Environmental Targets				P 2011														
PI-0106: Evolved EMS Approach				P 2011														

EN-6042 Environmentally Improved Terminal Area Navigation - Level 2 Automation/Mechanisms

Description: Air and ground automation and procedures for delivering aircraft on schedule at the runway for arrival and departure on routes Four Dimensional Trajectories (4DTs) are optimized from an energy and environment perspective.

> ***SOPR:*** FAA ***Primary Supported OIs:*** OI-6021
> ***SOCR:*** ***Primary Supported Enablers:*** EN-6043

Enabler Group: EMF Operation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6042: Environmentally Improved Terminal Area Navigation - Level 2 Automation/Mechanisms											E 2018							
EN-6004: Environmentally Improved Terminal Area Navigation - Level 1 Tools								E 2015										
EN-6046: Environmentally Improved Surface Operations - Level 2 - Enhanced								E 2015										
EN-6044: Avionics to Reduce Environmental Impacts - Level 2											E 2018							
D-1730: Aircraft Procedures and Control Technologies to Reduce Environmental Impacts									D 2016									
PI-0112: Dynamic Environmental Management Systems Approach								P 2015										

EN-6043 Environmentally Improved Terminal Area Navigation - Level 3 Dynamic Information

Description: Mechanisms (automation and procedures) to design and communicate dynamic flexible routes. These routes use Area Navigation Area Navigation (RNAV), Required Navigation Performance (RNP), and Optimized Profile Descent (OPD) techniques to develop profiles for control arriving and departing aircraft in an optimum manner from an environment and energy perspective. OPD is also known as Continuous Descent Arrivals (CDAs). The route design automation uses dynamic information form the Environmental Management System (EMS).

> ***SOPR:*** FAA ***Primary Supported OIs:*** OI-6021
> ***SOCR:*** ***Primary Supported Enablers:***

Enabler Group: EMF Operation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6043: Environmentally Improved Terminal Area Navigation - Level 3 Dynamic Information													E 2020					
EN-1066: Ground Based Navigation System (GBNS) - NextGen Lighting Systems											E 2018							
EN-6042: Environmentally Improved Terminal Area Navigation - Level 2 Automation/Mechanisms											E 2018							
EN-6045: Avionics to Reduce Environmental Impacts - Level 3													E 2020					
D-1730: Aircraft Procedures and Control Technologies to Reduce Environmental Impacts											D 2018							
PI-0112: Dynamic Environmental Management Systems Approach								P 2015										

EN-6044 Avionics to Reduce Environmental Impacts - Level 2

Description: Advanced aircraft to support low Required Navigation Performance (RNP) 0.3 for curved trajectories and airborne merging and spacing for en route, terminal and surface operations that reduce environmental impact.

> ***SOPR:*** FAA ***Primary Supported OIs:*** OI-6021, OI-6022, OI-6023
> ***SOCR:*** ***Primary Supported Enablers:*** EN-6042, EN-6045

Enabler Group: EMF Operation Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6044: Avionics to Reduce Environmental Impacts - Level 2											E 2018							
EN-6004: Environmentally Improved Terminal Area Navigation - Level 1 Tools								E 2015										
EN-6008: Avionics to Reduce Environmental Impacts - Level 1								E 2015										

EN-6045   Avionics to Reduce Environmental Impacts - Level 3

Description: Advanced aircraft avionics to maximize datalink applications that communicate and fly Four Dimensional Trajectories (4DTs) and airborne capability for making optimal lateral path adjustments for delegated separation of en route, terminal and surface operations that reduce environmental impact.

SOPR: FAA   *Primary Supported OIs:* OI-6021, OI-6022, OI-6023

SOCR: *Primary Supported Enablers:* EN-6043

Enabler Group: EMF Operation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6045: Avionics to Reduce Environmental Impacts - Level 3													E 2020					
EN-6000: Environmental Management Strategy	E 2008																	
EN-6004: Environmentally Improved Terminal Area Navigation - Level 1 Tools								E 2015										
EN-6044: Avionics to Reduce Environmental Impacts - Level 2											E 2018							
PI-0112: Dynamic Environmental Management Systems Approach								P 2015										

EN-6046   Environmentally Improved Surface Operations - Level 2 - Enhanced

Description: Demonstrate enhanced surface operation mechanisms to maximize airport throughput while further reducing aircraft fuel burn and emissions. Mechanisms through surveillance and associated advanced automation technologies (e.g. Automatic Dependent Surveillance-Broadcast) ADS-B) improve surface movement surveillance assisting in further optimizing taxi and runway sequencing for arriving and departing aircraft to reduce environmental impacts. Automation in conjunction with improved surface procedures seamlessly integrated with Trajectory Based Operations (TBO) between ground movements and arrivals/departures will demonstrate the value of collaborative operations, including potential for delegated separation procedures, for maximizing airport throughput while reducing fuel burn and emissions.

SOPR: FAA   *Primary Supported OIs:* OI-0340, OI-6021

SOCR: *Primary Supported Enablers:* EN-6042

Enabler Group: EMF Operation Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6046: Environmentally Improved Surface Operations - Level 2 - Enhanced								E 2015										
EN-6020: Environmentally Improved Surface Operations - Level 1 - Initial			E 2010															
R-0050: Applied Research on Sustainable Environmental Ramp Operations						R 2013												
D-1730: Aircraft Procedures and Control Technologies to Reduce Environmental Impacts						D 2013												
D-1740: Environmental Impact Management Capability						D 2013												
PI-0114: Environmental Standards - Global Harmonization			P 2010															

EN-6047   Baseline Environmental Condition - Level 2

Description: Refined baseline of current levels of aviation noise and emissions are available to serve as a benchmark for analysis demonstrating benefits or impacts of NextGen environmental performance.

SOPR: FAA   *Primary Supported OIs:* OI-6005, OI-6008, OI-6012, OI-6017, OI-6020

SOCR: *Primary Supported Enablers:* EN-6048

Enabler Group: EMF Tools Enablers

Enabler Listing																		
	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6047: Baseline Environmental Condition - Level 2								E 2015										
EN-6012: Baseline Environmental Condition - Level 1	E 2008																	
EN-6032: Science and Metrics of Noise - Level 2 Advanced				E 2011														
EN-6033: Science and Metrics of Local Emissions - Level 2 Advanced				E 2011														
EN-6034: Environmental Tradeoffs and Metrics of Fuel Burn - Level 2 Enhanced				E 2011														
EN-6039: Enhanced Global Climate Metrics				E 2011														
PI-0114: Environmental Standards - Global Harmonization			P 2010															
PI-0105: Refined NextGen Long-Term Environmental Targets				P 2011														
PI-0113: Environmental Impact Modeling and Assessment				P 2011														

EN-6048   Environmental Impact Modeling and Assessment - Level 2

Description: Physics based noise and emissions analysis tools for all classes of air vehicles, to provide higher-fidelity capability to data-driven decision-making environmental management system tool suites.

  SOPR: FAA   *Primary Supported OIs:* OI-6020, OI-6021, OI-6022, OI-6023

  SOCR: *Primary Supported Enablers:*

Enabler Group: EMF Tools Enablers

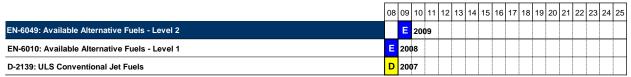|	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6048: Environmental Impact Modeling and Assessment - Level 2											E 2018							
EN-6011: Environmental Impact Modeling and Assessment - Level 1				E 2011														
EN-6034: Environmental Tradeoffs and Metrics of Fuel Burn - Level 2 Enhanced				E 2011														
EN-6047: Baseline Environmental Condition - Level 2								E 2015										
R-0200: Applied Research on Noise and Emissions Relationship Science and Models									R 2016									
R-1330: Applied Research on Noise and Emissions Analysis Tools									R 2016									
R-1780: Applied Research on Tools and Metrics to Model the Impacts of Emissions									R 2016									
D-1020: NextGen (N+1) EMS Analysis Tools									D 2016									

EN-6049   Available Alternative Fuels - Level 2

Description: Determine feasibility of drop in ultra-low sulfur (ULS) Jet A from conventional fuel sources. ULS Jet A offers the potential for reducing the impacts of aviation on air quality.

  SOPR: FAA   *Primary Supported OIs:*

  SOCR: *Primary Supported Enablers:* EN-6050

Enabler Group: EMF Technology Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6049: Available Alternative Fuels - Level 2		E 2009																
EN-6010: Available Alternative Fuels - Level 1	E 2008																	
D-2139: ULS Conventional Jet Fuels	D 2007																	

EN-6050   Available Alternative Fuels - Level 3

Description: Obtain American Society for Testing and Materials/ Federal Aviation Administration (ASTM/FAA) approval for a drop in 100% Synthetic Paraffinic Kerosene (SPK) fuel created through Fischer-Tropsch (F-T) synthesis. Obtain ASTM/FAA approval for a 50-50 blend of a SPK fuel created from renewable oil sources. Use of SPK fuel created from renewable resources in aircraft offers potential for (1) reducing emissions affecting air quality and (2) reducing life-cycle carbon dioxide emissions affecting global climate change.

  SOPR: FAA   *Primary Supported OIs:*

  SOCR: *Primary Supported Enablers:* EN-6051

Enabler Group: EMF Technology Enablers

Enabler Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6050: Available Alternative Fuels - Level 3						E	**2013**											
EN-6049: Available Alternative Fuels - Level 2	E	**2009**																
D-0750: "Drop-In" Alternative Aviation Fuels				D	**2011**													
PI-0114: Environmental Standards - Global Harmonization			P	**2010**														

EN-6051   Available Alternative Fuels - Level 4

Description: Obtain American Society for Testing and Materials/Federal Aviation Administration (ASTM/FAA) approval for a "drop in" 100% Synthetic Paraffinic Kerosene (SPK) fuel created from renewable oil sources including algae oil. SPK fuels are available and used in sufficient quantities to reduce aviation's impact on the environment.

> *SOPR:* FAA   *Primary Supported OIs:* OI-6017
>
> *SOCR:*   *Primary Supported Enablers:*

Enabler Group: EMF Technology Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6051: Available Alternative Fuels - Level 4								E	**2015**									
EN-6050: Available Alternative Fuels - Level 3						E	**2013**											
D-0750: "Drop-In" Alternative Aviation Fuels						D	**2013**											
PI-0109: Environmental Technologies Development					P	**2012**												

EN-6053   Science of Global Climate - Level 2 Advanced

Description: Advance scientific understanding and characterization of aircraft global emissions, and the atmospheric transport of these emissions.   Establish the trade-offs with other environmental impacts and costs and benefits of mitigating aviation. Enhanced scientific understanding will support establishing metrics and targets for influence on global climate change.

> *SOPR:* FAA   *Primary Supported OIs:* OI-6021, OI-6022
>
> *SOCR:*   *Primary Supported Enablers:* EN-6039, EN-6041

Enabler Group: EMF Science and Metrics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6053: Science of Global Climate - Level 2 Advanced				E	**2011**													
EN-6038: Science of Global Climate - Level 1 Baseline	E	**2008**																
R-1760: Applied Research on the Methodologies and Metrics to Assess Climate Change Impacts		R	**2009**															
D-2141: Methodologies and Metrics to Assess Aviation's Impact on Climate Change		D	**2009**															
PI-0114: Environmental Standards - Global Harmonization			P	**2010**														
PI-0105: Refined NextGen Long-Term Environmental Targets				P	**2011**													

EN-6054   Enhanced Water Pollution Mitigation

Description: Water pollution mitigation techniques, including technologies and operations. Airplane and runway de/anti-icing agents contain less-toxic and environmentally harmful ingredients, minimizing potential impacts to water quality from biological/chemical oxygen demand, while maintaining or enhancing effectiveness of operations.

> *SOPR:* FAA   *Primary Supported OIs:* OI-5110, OI-6020
>
> *SOCR:*   *Primary Supported Enablers:* EN-5020, EN-5023, EN-5024

Enabler Group: EMF Science and Metrics Enablers

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
EN-6054: Enhanced Water Pollution Mitigation									E	**2016**								
EN-6006: Baseline of Required Water Pollution Mitigation Needs				E	**2011**													
R-0760: Applied Research on Water Pollution Impacts and Mitigation Options							R	**2014**										
PI-0105: Refined NextGen Long-Term Environmental Targets				P	**2011**													